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ABSTRACT

This case study describes an innovative school entry system in which children are registered at school according to their stage of development, not their age. The system was introduced by law in Hungary in 1986. In this study, an introduction is followed by a discussion of problems in curricular articulation. Problems are discussed in terms of the biological, intellectual, and social development of 6-year-olds. Consequences of developmental differences for curricular articulation, and aspects of the problem of using calendar age as the basis for school entry, are considered. Problems of conventional structural articulation, or fixed age admission, are discussed. Discussion focuses on the origin, characteristics, and main consequences of conventional structural articulation. Topics of this discussion include high repetition rate in the first grade, determination of students' futures, and obstacles to educational improvement. Efforts to overcome the consequences of articulation dysfunctions are critically reviewed and contrasted with an approach adapting the school to the student. The Hungarian model, which is an adaptive articulation model, is extensively described in terms of its core components: structure and functioning of the innovative entry system; evaluation procedures of classification and diagnosis; and preventive education in preschool. (RH)

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ARTICULATION OF PRE-SCHOOL WITH PRIMARY SCHOOL IN HUNGARY: AN ALTERNATIVE ENTRY MODEL

József Nagy

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József Nagy

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FOREWORD

This volume in the UIE series of Case Studies on lifelong education deals with one small segment of that process, but a segment which is crucial to the subsequent progress of every child through formal education and out into a wider world of educative and informative messages. The importance of the entry level of primary education can scarcely be overstressed, since a child's initial perception of school and schooling has a lasting effect. Success or failure in the first few weeks can determine performance and attitudes for a disproportionate length of time.

The experience of school entry does not depend solely on the ambience of the school in question, though, as each child has already undergone significant formative education in the home and the local community. In an increasing number of countries, a part of it will have been acquired through socialization and incidental or deliberate instruction in a playgroup, kindergarten or pre-school, as is the case in Hungary. If lifelong education is to be a steady process of building up a body of knowledge, skills, attitudes and insight, without disturbing breaks, hiatuses, repetition and confusion, the segments of formal education need to fit together following a process of vertical articulation.

This is our concern here. Lifelong education has been the major field of research of the Unesco Institute for Education since 1972. Our earliest work examined the links between home, school and community, which are of immediate relevance to kindergarten and primary schools. These institutions need to know the home background and

the aptitudes of the child, both realized and potential as, at first, they have no previous school reports on which to base their judgments. As the child progresses, educational assessments by kindergarten teachers and other professionals can be made, but their influence remains inferior to that of the parents.

Professor Nagy's work recognizes the double axis of this integrated approach to education, both the vertical articulation between types of educational institutions, and the horizontal linkages between school and home. What we present in this case study is a concrete example of arrangements made to ensure vertical integration in Hungary, reinforced by a replication of the experiment in Sri Lanka.

In selecting the Hungarian model for study as part of our research programme, our intention was, in the framework of lifelong education, to follow up and report on the success of a project which aimed at ensuring appropriate learning of high quality. What has resulted is not only a theoretical construct, but also a realistic working scheme which takes into consideration the practical constraints of implementation. Moreover, although this is not the principal objective, by expressing concern for the intellectual and physical preparedness of each individual child to enter primary education, school and kindergarten teachers, backed if necessary by the educational psychology services, can encourage parents to make a greater contribution to the child's development. We are delighted that a system has been devised which can reduce substantially the chances of school entry's being a negative experience, and can in consequence promise fewer examples of continual failure, disaffection and even rejection.

An indication of the success of this Hungarian model of vertical articulation between kindergarten and primary school, for which Professor Nagy is himself largely responsible, is that from being an experiment it has become a research-based national policy. As he reports here, its principles, chief among which is the abandonment of calendar age as the rigid measure of obligatory school entry, have been verified in Sri Lanka. We may add that the concept of testing for readiness for school, and the admission of a proportion of older and younger children among each intake, can be applied equally well even when kindergartens or other pre-school groups are not as widespread as in Hungary. This model and its implications therefore deserve serious consideration by all those educators and policy makers anxious to improve the quality of formal education and to reduce drop-out and desertion.

On behalf of UIE I express my profoundest gratitude to Professor Nagy, both for leading the experiment and for reporting on it so lucidly and straightforwardly. He has acted as external project coordinator to UIE, and has regularly met us and kept us informed. I am also particularly grateful to Mrs. Kathleen Wodala for her initial editing of the text, and to Miss Zsuzsanna Juhász for preparing the typescript. At UIE, I should like to thank Mr A. Mahinda Ranaweera for coordinating this work within the Institute, and Mr Peter Sutton, who carried out the final editing.

Ravindra H. Dave
Director
Unesco Institute
for Education

1. INTRODUCTION

Entering school is one of the great events of life both for the child and the family. This is easy to understand since the child's whole previous way of life changes. This fact is enough in itself for a number of children to face difficulties of adaptation in the first form. Today practice and educational literature offer a rich variety of devices to overcome this problem. Over the past few decades, however, it has become more and more obvious that the articulation of family and pre-school to school is not just a problem of adaptation which can be solved by successful habituation.

Even at the turn of the century, when the overwhelming majority of children were registered in the first form of elementary school, the extremely great differences between children became obvious. The well-known Binet-Simon intelligence test, for example, was created with the aim of separating those who differed most, the handicapped, so that they could not attend the same classes as the other children. In England, the logical result of taking into account the differences was the selection of children according to their abilities, for so-called homogeneous classes based on ability. Reform education (especially in the United States) has also conducted many experiments and tested plans for the organization of conventional school, according to the principle that a whole generation enters school at the same time and remains together in one class. The students of each class progress together through the contents and activities prescribed by the curriculum.

Progressing together, however, became less and less easy to achieve. The rates of drop-out and failure are high. Failure in the first form has even exceeded 30 % in some countries. Research has shown that the starting level of de-

velopment of children predetermines their whole career at school.

Since the 60's, wide-ranging compensatory programmes which prepare children for school have spread throughout the world, led by the American Head Start programme, to increase the chances of disadvantaged children entering school in a more successful way. That means an attempt to lessen by educational devices the extreme differences between those who enter school. Unfortunately, these programmes were unable to solve the problems, or come up to inflated expectations. Nowadays it is clear that the differences between children are so great when they enter school that compensation cannot lessen the disadvantage of those who lag behind to any great extent. It can provide only a limited solution to the problem.

An attempt to solve the problem in principle can be found in the theory of lifelong education. According to this, education should guarantee the optimum development of the personality continuously all through life. The principle of adaptable, optimal, horizontal and vertical articulation of the most varied educational factors follows from this. Consequently, the articulation of the family home, preschool and school must be re-evaluated in order to find an adaptable co-ordination that would help the optimal and continuous development of the individual.

R. H. Dave in 1975 (p. 43) expressed these concepts as follows: "Lifelong education is a comprehensive concept which includes formal, non-formal and informal learning extended throughout the life-span of an individual to attain the fullest possible development in personal, social and professional life. It seeks to view education in its totality and includes learning that occurs in the home, school, community, and workplace, and through mass media and other situations and structures for acquiring and enhancing enlightenment. In this context the concept of lifelong education provides a new perspective to all educational goals, activities and structures, emphasizing the all-round development of the individual over the whole life-span".

As regards flexibility he emphasised: "within schools the classroom system will be replaced by a flexible system of options, in which the learner can locate himself according to his personal characteristics and his present position in society. ... For teachers this new structure, with education covering all ages, no rigid grade structure, and local autonomy, means changed roles; the teacher will became a co-learner rather than a director of other people's learning"(Dave, 1976, p. 348).

This study analyses the problems arising from *rigid conventional articulation*: high drop-out and repetition rates, which present obstacles to innovation, predetermine the pupils' future, and cause failure or limited success.

In the spirit of the above ideas it examines the possibilities of finding solutions, and the limitations of these solutions; it will also introduce the *flexible entry system*, begun in Hungary, which may contribute towards solving the serious problems of rigid articulation between pre-school and school.

These problems await solution in developed countries. It is certain, however, that they are less serious there than in developing countries, where compulsory registration in the first form has become general only over the last few decades or is only now being carried out. As a result of this an extremely wide variety of children from very different social strata enter the first form. Therefore, we have tried first of all to concentrate on the problems of readers in developing countries.

2.PROBLEMS IN CURRICULAR ARTICULATION

The traditional development of the curriculum is based, among other things, on the premise that the maturity of children entering school should be taken into account. In practice, it means that we make use of the knowledge gained from psychological descriptions of the population of this age as well as the practical experience of education. Sometimes we carry out experiments, or rather tests on whether the prepared curriculum can be taught or not. We do not, however, have detailed knowledge of the development of children and/or of the differences arising from their different levels of development. In this way, in many countries reliable knowledge is not available on how many children know the letters and at what level and how well they can read. *It means that we do not have enough knowledge on the entry behaviour of this age-group.* This is one of the problems of the curricular articulation between pre-primary and primary schools.

It is common knowledge that children vary greatly in most of their characteristics before entering school. If we want to bring up, to educate an individual child there are no problems concerning the differences between the children. But the teacher at school has in fact a group of children. In this case, the differences between the children become vital, especially at the beginning of schooling. Here again the problem is that we usually have only generalized psychological knowledge about the differences between children and the experiences of teachers. Detailed knowledge about the differences between the children entering a particular school is not usually available. *This means that we do not have enough knowledge on the entry behaviour of the individual children entering school, either.*

This is another problem of the curriculum articulation between pre-primary and primary school.

In this chapter we shall try to show some selected data on the development of the entry age-group and on the differences between individual children, and to see the significance of such knowledge and the magnitude of the problems in curricular articulation between pre-primary and primary schools. (The data in this chapter are from research carried out in Hungary and later in Sri Lanka, so for simplicity's sake, we refer here only to the books where the results of the two research programmes are published: Nagy, 1980 and *Entry...*, 1988. With regard to the extent of the differences, the results of research carried out in several countries do not significantly differ from the results of the two above-mentioned research programmes: see, e. g., Wang and Lindvall, 1984.)

2.1 Biological development of six-year-old children and its consequences in curricular articulation

Concerning the biological development of the entry age-group, we studied 133 variables (65 relating to condition at birth and disease, and 68 to actual state of body and health) collected from 1,000 five and six-year-old children. This set of variables contains practically all the variables which are conventionally collected and measured. The analysis (based on correlation techniques) showed that most of these variables did not play any role in the intellectual and/or social development of five to six-year-old children.

As regards biological development, less than ten variables were identified which were correlated with the intellectual and/or social development of five to six-year-old children. These were used in assessing the national sample. I have selected here the three most important variables to be analysed: weight, change of figure (Philippini test) and writing movement co-ordination.

The average *body weight* of six-year-old Hungarian children is 21 kgs, 2% of them are less than 16 and another 2% more than 29. About 12% of them are less than 18 kgs. This represents more than one year of retardation in biological development and is not due only to physical constitution and build. At the same time, 14% of them weigh more than 24 kgs, which means more than one year's acceleration in biological development.

Weight has a relatively high significant correlation with intellectual and social age ($r=0.29$ and $r=0.21$ respectively), but the other physical variables have no significant correlations (for instance, height: $r=0.14$ and $r=0.08$). To be more concrete, biologically retarded children are, on average, more than six months behind and the accelerated are more than six months ahead of the average within the six-year-old population both intellectually and socially.

Teachers know from their experience that most small, light-weight children tire easily, about twice as easily as the strongest and most accelerated class-mates. In fortunate cases, the average level of biological development of children in the first classes is taken into account when the possible physical burden of the curriculum is considered. But in many cases, children are overburdened by sitting and working for four or five hours per day. The main problem is that about 12% of the children are not physically ready for school life even if the average child can cope with it.

There is a well-known phenomenon in the biological development of five to six-year-old children: *this is the second change of figure*. The most visible signs of this are that the body becomes slimmer and the arms longer. A very simple test (the Philippines test) may help to check whether this change has come about or not. (The child is asked to touch his/her left ear with his right hand above the head and then do the same with his right hand. If the test is positive, due to the child's arm being longer, there is a high probability that the figure change has taken place.)

Six-year-old children with positive Philippines test results are one year older intellectually than children with

negative test results. The differences are the same concerning social age. The correlation coefficients between Philippines test results and intellectual and social age are: $r = 0.38$ and $r = 0.31$.

This means that children who have already undergone the second change of figure before entering school have a much better chance of being successful in the first few classes of school, physically, intellectually and socially, than those who are just undergoing this stage of development. And children in whom this process has not yet begun are very likely to have difficulties in coming up to the curricular expectations which are designed to suit the average child.

For a successful start at school, it is of vital importance how much success the child has in writing acquisition (this also has an effect on learning to read). These facts have been known for a long time. Teachers are daily faced with the problem that a considerable percentage of pupils have immense difficulty in learning to write, and some of them are unable to advance with the others. Leaving aside the rare cases of lack of motor co-ordination with an organic origin (which causes dysgraphy), the extremely varied level of development in the fine motor co-ordination of the fingers and the hands lies at the root of the problem. It is well known that among the causes of accelerated or retarded development, inner maturity processes play an important role as well as the opportunity for practice offered by the environment (which is why this topic is being discussed here).

Learning to write needs a special motor co-ordination, the recognition of relatively small complicated figures and the reproduction of these drawings in the appropriate place and the required size. That is why it is useful to examine not the development of the fine motor co-ordination in general, as is often done, but the ability to copy figures which is characteristic of writing. This elemental ability (skill) is called *writing motor co-ordination.*

Writing systems can be reduced to some elemental lines and their modes of connection. The most important

elements are the straight line (direct section), the curve (arc), the circle (circle or elliptic line) and the spiral. The elements are connected by forming angles, vertical strokes, arcs and loops. Letters contain generally between two and four elements. Therefore it is useful to work out a means of evaluating writing motor co-ordination that takes these specifications into account.

In Singhalese, for example, the spiral plays an important role, in Tamil two lines connected at right angles form a significant element, while Hungarian writing being of Latin origin does not make use of spirals or lines connected at right angles. On the other hand, the loop occurs frequently. Our experiments have shown that the most important elements of a writing system can be built up using three or four elements and one to three figures with two elements and two or three figures with more than two elements. (These data have been obtained from an analysis of Hungarian as well as Singhalese and Tamil.) All of them contain lines, curves and circles, while Singhalese and Tamil have spirals, too. These are the elemental figures. We worked out experimentally from them figures varying in complexity and mode of connection. There are a total of eight drawings approximately 1.5 cm high in the test for each language. These had to be copied. We have evaluated the figures from the criteria of being recognizable, their situation on the paper, dimensional accuracy and neatness.)

On the basis of the analyses, full development of writing motor co-ordination is indicated by a score of over 75%. Therefore this is the mastery criterion. Experience shows that scores of 50-60% are also sufficient because the development of this ability is very rapid between the ages of 5.5 and 6.5. By the end of the seventh year this process is complete in every healthy child.

The problem arises from the fact that in more than half the children entering school writing motor ability has not developed to a level on which the successful teaching of writing can be based. About half "grow up" to the demands of learning to write because of the accelerated maturation

process. They overcome the problem without any serious difficulties. The 25-30% of children, however, who mature more slowly suffer grave damage which affects their whole lives. These children struggle - and the less developed their writing motor co-ordination the more they struggle - with the writing exercises, and fail day after day, which can affect the whole of their later career at school.

At length every healthy child can learn to write, does undergo the second change of figure, grow and become stronger; that is, his physical and physiological development has not halted. In this sense the children who are slow to mature do not suffer damage.

The damage occurs in mental, emotional and social development and takes the form of overburdening, continuous failure, antipathy against school and learning, and demotivation. The cause of this is not to be found in the child. Considerable biological and physiological differences between children are the most natural things in the world. The damage arises from the fact that the curriculum does not pay attention to these differences; neither can our teaching or, what is more, our whole educational culture adapt itself adequately. We can state as well that the value and importance of the problem has not been properly recognized. In the 60's and 70's the failure of preparatory, "closing the gap" courses, coaching and compensatory movements dealt a serious blow to the belief that this problem could be solved.

2.2 Intellectual development of six-year-old children and its consequences in curricular articulation

The intellectual and mental development of children entering school and the differences between them have been examined in many ways. Our research clearly shows that within one class there are differences of several years in intellectual age. In other words calendar age and mental age can differ greatly. As a general statement this is now a mere

commonplace echoing the results of experience. The practising teacher finds it difficult to evaluate the importance of this fact and the magnitude of the problems arising from it or to identify and work towards a solution, especially if the data are taken from intelligence tests or the like.

The teacher in the first form teaches children to read and write, he/she directs mathematical courses (using traditional or new mathematics), and organizes constructive games or similar activities. In a word, the differences and problems become obvious for him/her during the school lessons themselves. Therefore, it is much more useful if we examine the differences in a field closely connected with the content of school activity. We have tried to bring this trend into our research.

The more important themes that have been examined are the following: general vocabulary, relational vocabulary, deduction, sentence structure, knowledge of letters, counting, quantity and recognition of numbers. We can draw up an index from these tests, of course. Before giving examples, we would like to mention that this index correlates at about 0.7 with the IQ in various intelligence tests. This is why we can say that these indices, especially their aggregate index, are also indications of intellectual and mental development. The above-mentioned tests correlate with each other at about 0.5- 0.7.

Several kinds of index can be chosen to express the extent of the differences between children. Perhaps time is the most graphic, so we will choose this one. Time is expressed most frequently in age. Besides calendar age, the knowledge of biological, social and mental age can be very helpful. The latter three are meaningful only when compared to calendar age. In this subchapter we will deal with mental development. If, for example, a child's mental age is 6.3 years, it means that he is average for a 6.3-year-old population. His calendar age can differ from this. Taking this into account, we express the extent of retardation or acceleration in time. If, for example, the calendar age of the

above child is 5.3 years, he is one year accelerated, if it is 7.3 he is one year retarded.

Once the mental age is known, the extent of the difference in development between children of the same generation can be calculated. Our research has shown that among six-year-olds there are some (not mentally handicapped) children whose mental age is 3.6 years, and there are others whose mental age is 8.6 years. This means that the difference between the most and the least developed children entering school is $\pm$ 2.5, i.e. five years. (The calculations were made after removing the results on 5% of the children at each end of the scale in the sample. So the above and the following data concern the remaining 90%.)

From the viewpoint of more effective school work, it is essential to know the mental age of the particular child and the extent of the difference between children of a given calendar age. However, from the basic data some more important information can be extracted: the average time taken to achieve development and mastery.

The above data can show, too, that the five-year difference in development is a five-year average time taken for development. Children with a mental age of 3.5 years, that is the least developed children entering school, would need an average of five years to reach the level of the most developed children. This is an average time of development because learning ability, conditions for learning and periods of acceleration and deceleration can result in a considerable positive or negative deviation from the average in the pace of development of individual children.

Mental age and the average time of development are in relation to the average development of the population, i.e. this evaluation is norm-referenced. Norm-referenced evaluation follows the theory of classical psychometry and assesses people as they compare one to another, and the basis for comparison is, most often, the population average. This well-known solution brings with it the less widespread view that considers development and learning a process

neither the end nor the beginning of which is defined. If we also take into consideration the procedure whereby succeeding populations are compared each with its own average, the insusceptibility of norm-referenced evaluation becomes especially important in mastery procedures as it always compares each population with its own population average.

If we consider the psyche as a unit made up of several relatively independent psychic systems, in which the beginning and the end of the development and mastery of the various psychic systems can be defined, we arrive at an approach basically different from the above from the point of view of school work. We can discover the average time needed for the mastery of the individual psychic systems (and, of course, the distribution of the individual differences, too.)

Let us consider, for example, writing skill. This is a relatively simple and well-known psychic system for all who are able to write, therefore it is a good way of illustrating the phases and levels of the mastery process. The phase of development lasts from zero to the mastery of all the letters and their connections, i.e. till the minimum operative level (that is drawing/writing skill) is reached. From this minimum level begins the phase of optimally operating writing skill, which is called a running hand, and which comes about in the course of many years' practice while the achievement is multiplied more than ten times. The optimum level varies from person to person, but there is a definable limit below which we cannot speak of a running hand. There even exists an absolute maximum which appears in the highest results achieved by man at the moment, but the criterion of optimum mastery is the end of the development phase.

As is known, the basis of comparison for criterion-referenced evaluation is the level of mastery to be achieved. For example, it can be at least 80% in a school subject test. A test on a school subject embraces a smaller or wider field and not a given psychic system. Therefore the criterion of

mastery can be given only as a percentage. The process of mastery, its phases, the criteria of these phases, and the time required cannot be discovered. If the object to be evaluated is some psychic system that can be defined well (ability, skill, competence, concept), the process of mastery can be examined and on the basis of this the criteria of minimum and optimum mastery can be defined empirically. The time required for optimum mastery can be calculated from the data. (We shall presently give an example that illustrates the essence of the calculation as well.)

The more concrete and the simpler a psychic system is, the easier it is to discover the phases of development and its criteria, and the more comprehensive and complicated the system, the more difficult this is. Therefore the differences can usually be expressed in time taken for development as compared to the average, on the basis of the aggregate indices, IQs and the like. In the case of more concrete, simpler psychic systems, the differences between children can be expressed in the average time needed for optimum mastery, as well as the time taken for development.

First we are going to examine closely two psychic systems which can be regarded as basic from the point of view of successful schooling. Then we shall analyse the problems revealed by the aggregate index of intellectual development.

Things can be recognized and understood by their relations; their treatment and transformation are the transformation of relations. The number of elemental, basic relations in space (below), in time (early), in quantity (some) and in extent (more beautiful) can be estimated as about 250-300. The small child first learns to recognize, sort into order and manipulate the range of relations which can be perceived in objects by handling them continually in his fingers for two or three years. Then he gets to know the terms of the relations through the acquisition of language, and after that the terms of more complicated relations (equal). These relational terms form the basic set of

operators of each language. Without these words, not only is the language unable to operate but we cannot understand the items of information given or the relations between things either. We presume a knowledge of these words in everyday language and use them as a device in teaching children entering school. Therefore, as regards successful school work, it is extremely important that we should know how well the children entering school know these relational terms.

The easiest way of checking knowledge of these words is with pictures. For example, a drawing can show a table with balls on, above, beside and under it. We ask the child to point to the ball under the table, etc. With a little imagination it is possible to draw a picture to check the knowledge of every relational term.

There are different layers in the vocabulary of relations, for example the mathematical technical terms used by relation theory (equivalence), the more refined use of words by scholars (thereafter), etc. Leaving aside all these, we arrive at a basic layer consisting of 150-200 words. We chose 192 words for the Hungarian test and 160 for Sri Lanka and divided them into eight equal test papers, so that we asked each child to respond to 24 or 20 words. The sample was large enough for us to find out how many children know each relational term. After checking for equivalence we could state using only one sheet the proportion of relational vocabulary a given child had mastered. To obtain a picture of the process of mastery, we also tested the children one year before entering school and at the end of the first class. The three populations provided information on the pace of mastery taking place over a period of two years. The average time taken to achieve mastery could then be estimated from this information.

Taking into account errors in measurement (reliability), we can say that a result over 90% means total (maximum) possession of relational vocabulary. On the basis of the analysis of distributions, the criterion for optimum mastery of the basic layer can be given as 120 words shown

correctly. This is the equivalent of a 75% score. Any level above this is sufficient for successful school entry.

In Sri Lanka, 32% of four-year-old children, 51% of five-year-old children who had just entered school and 85% of six-year-old children who were at the end of the first year achieved optimum mastery (the Hungarian data are quite similar). This means that about half of those entering school and 15% of those who have completed the first class have not yet mastered relational vocabulary, which causes them to face serious problems at school.

The magnitude of this educational problem is shown by the time necessary to achieve mastery. To illustrate this, let us take the following method of estimation. Four-year-old children, in Sri Lanka, generally know 96 of the 160 relational terms, while six-year-old children know 144. In other words, on average, the children's relational vocabulary increases by 48 words in two years and by 24 in one year. This means that on average five years are needed for optimum mastery. The surveys show that there are some children who need only three years to arrive at the optimum but there are others for whom not even seven years are enough.

Three per cent of children entering school have mastered fewer than 40 relational terms. It follows from the above data that, assuming a progress of mastery of average speed, they need some three further years for optimum mastery. Or those 10% of children who have mastered half of the vocabulary need almost two more years. (If we express the difference in time taken for development, it is exactly $\pm$ 2.5 years in the group entering school.)

Let our other example be counting. This skill consists of two well-known components. One of them is rote counting, which is a verbal series and means the enumerative knowledge of the terms of the numbers from 1 to 21 (this is the prerequisite for the formation of the concept of number). The other one is pattern finding, which means the mastery of counting in a way that is adequate for the understanding of the structure of the numerical system within

various numerical ranges and later numerical systems of any extent. It should be noted that the ability to count is by no means a mere verbal skill. It correlates with manipulative, pictorial, formal operations, different intellectual achievements and intelligence quotients between 0.55 and 0.80.

The test consists of two parts. First we ask the child to count as far as he can. We write the last number in the correct series down in the test paper. If he counts up to 21 without any mistake, we stop him there and put 21 on the paper. We test pattern finding in the following way: the teacher begins counting (26, 27, 28) and the student carries on (29, 30, 31). We do the same with 40, 50, 60, 100 and 500. (These numbers have been selected on the basis of several tests.) The maximum raw score according to the above experiments is 27. On the basis of the analysis of distributions, at least 20 points mean optimum mastery of the first phase of counting, of rote counting.

Before analysing differences in mastery, let us survey general development. Four-year-old children had raw scores of 11 and 10, five-year-old children 15 and 14 and six-year-old children 19 and 19 (the first numbers are the data for Hungarian children, the second are from Sri Lanka). While the average is practically the same, the distribution in the population of four and five-year-old children in Sri Lanka is essentially higher (the values of relative distribution expressed as a percentage in the above order are: 47,70; 43,53; 32,32).

The difference between Hungarian children entering school is $\pm$2.3 years expressed in the average time taken for development. They reach mastery of counting within the range 1-20 (the optimum criterion of a raw score of 20) in an average of four years.

With this knowledge, let us examine the distribution. Four per cent of children entering school can count within the range 1-1000, 11% of them within the range 1-100. A further 28% are in the process of mastering the 1-100 range. So 53% of the children have gone beyond the 1-20

range that is the optimum criterion. On the other hand, 1% of children entering school cannot count at all, a further 1% are just learning the 1-5 range, 3% are already able to count within the range 1-5 but cannot yet count up to 10, and 7% can count up to 10. The remaining 35% are learning to count from 10 to 20 when entering school.

If we take knowledge of the 1-20 range as the criterion, there are some children among those entering school (assuming a general pace of learning) who reach this level only after four years, while 53% of the others have already gone beyond it. But those who have already mastered the 1-10 range need almost two further years. Our experiments show that school does not increase the speed of learning or the mastery of counting ability in these children. It is rather those children who already have a higher level of knowledge who profit more from the school and home environment.

If we also take into consideration the fact that 15% of children have mastered the 1-100 range when entering school, it is worth paying attention to the duration of learning necessary for the mastery of this level. Children who cannot count at all need 5.8 years, those who have mastered only the 1-5 range need 4.7 years, and those who can count only within the 1-10 range need 3.6 years to reach the level of the 15% who know most.

We have already mentioned that the differences in development expressed in mental age reckoned on the basis of the aggregate index amount to five years (without the 5% at each end of the scale of development). This means that the least developed 5% need at least 2.5 years to reach the average level of the population and five years to approach the level of the most developed 5%. Now let us consider some further data on the standard deviation. The difference in development between the most developed 15% and the least developed 15% falling outside standard deviation is at least three years. In other words, at least 1.5 years are needed for the least developed to reach the average level of the population and three years to approach

the level of the most developed children. The proportion of children who need a further year (in fact, a much longer period in the majority of cases) to reach the average level of the population is about 25%.

In the knowledge of the above data, it is quite understandable that traditional schools cannot handle these differences and, as a result, why the differences are continuously increasing. With regard to biological-physiological processes, we have written that they take place in each healthy child, though sometimes late. Harmful consequences arise from the work-load being too high or too low: in any case not appropriate to the child's level of development. The effect on mental development, which should advance by means of the basic cultural abilities (mother tongue, elementary thinking, and mathematical operations and the like), is that it comes to a permanent stop or, in the case of more developed children, that the possibility to go further is not taken advantage of.

2.3 Social development of six-year-old children and its consequences in curricular articulation

Social competence is the system of social abilities and adaptability which govern our decisions in our relations towards people, work and values in given situations. The formation of elementary social competence takes place in the period between birth and the age of five to eight. Because of this, a child will behave according to expectations in his relationship towards adults (his parents, relatives, acquaintances, and unknown people) and his fellows; he develops an elementary sense of differentiation between good and bad, correct and incorrect behaviour; he internalizes the evaluation of his environment; the fundamentals of his relationship towards work also begin to take shape through performance of tasks.

Social behaviour can be examined, of course, in many ways. We have started from the fact that the development

of a relationship towards people, values and tasks plays a decisive role in the successful entering of school.

As children at school have to cooperate with the teacher and their fellows, we examined the extent to which the child is able to take part in the creation of the contact required for cooperation in order to solve tasks, how he can achieve this together with the teacher (we shall call this simply contact establishment), and what attitude he has to his fellows in the group when solving tasks (whether he disturbs the work of others, if he can tolerate the disturbing influence of anybody else, etc.).

We examined the elementary sense of ethics by telling a short story with events which can be evaluated simply from an ethical point of view and on the basis of a conversation connected with the story.

School makes children face tasks which they have to accept and perform several times a day. Three elements of this were examined. One was task perseverance, i.e. the extent to which the child can accept the task, make it his own aim and act in order to achieve this aim. Concentration was next, i.e. how well he can concentrate on the aim to be achieved. Tasks are usually complicated, built up one on another. Therefore, it is important that we should know how well children can understand delayed instructions, in other words, stand their ground in everyday situations of "when you have done this, you will..." and "if this has taken place, then ...").

These elements occurred both in the Hungarian and the Sri Lankan examinations. The Hungarian examinations included more details and contained also an evaluation of the development of self-helpful habits. However, as the basic concept of the research is the same, we can draw a comparison as regards the whole of the development of social competence, of course with the necessary reservations.

As in the previous subchapter, we are going to follow the method of choosing two elements (contact establishment and task perseverance) and illustrate what we would like to say with their help. Then we shall illustrate the dif-

ference between children according to their relationship with people and tasks by the help of aggregate indices (we evaluated the various elements several times to accumulate aggregate indices). Finally, we shall introduce the differences obtained from the index of social competence.

A quarter of Hungarian children were initiators in contact establishment, themselves proposing cooperation. For about half of the total population, an encouraging smile was enough: they opened up and were willing to work together. That is, three quarters of six-year-old children possessed a well-functioning ability for contact establishment. Eighteen per cent of the children became friendly as a result of a conversation about their parents. For a further 2% this was not enough, but a short tale dissolved the rejection of cooperation. Less than 2% of the children became able to cooperate only through some kind of special attention (a game together, drawing, playing with puppets, etc.) The proportion of children with whom no connection could be made was only a few per thousand. Sixty per cent of five-year-old children attained optimum mastery. The values of the categories described above (almost complete, half, slight, no mastery) are :25%, 10%, 4%, 1%. We find similar values in the case of the Sri Lankan children, except for the proportions in the two categories of optimum mastery. The majority of Sri Lankan children had almost complete or half mastery of contact establishment. This can be explained partly by the valuing techniques used (which in this book it would be unnecessary to touch upon), but the hypothesis concordant with my experience can also be made that Sri Lankan children are somewhat more willing to cooperate.

As regards task perseverance, 22% of the Hungarian children performed the given task without exhortation, enthusiastically and assiduously. A further 40% worked persistently with some encouragement; till they finished the task. So 62% of the six-year-old children who had entered school possessed an elementary ability of task perseverance on the optimum level. Nine per cent of the children needed

repeated encouragement; continuous exhortation was required for 8%. (They wanted to stop performing the task and only firm persuasion proved to be helpful.) In the case of 1%, they could not be persuaded to perform the task. The data for six-year-old Sri Lankan children are similar (in the above order: 27+34=61%, 28%, 9%, 2%); on the other hand, the data for five-year-old children are essentially better: 26+30=56%, 26%, 10%, 7%, as against those for Hungarian children: 11+31=42%, 39%, 15%, 4%). This can be explained by the fact that children in Sri Lanka work on expressly school-type tasks in pre-school, which accustoms them to performing tasks that require perseverance.

According to the aggregate index of contact establishment, in Sri Lanka, 69% of five-year-old children and 84% of six-year-old children have mastered this elementary social ability (the Hungarian data are lower: 60% and 76%). To reach the optimum level, 15% of five-year-old Sri Lankan children and 8% of six-year-olds need one year, 11% and 5% need two years, 4% and 1% need more than two years to master this ability (the data for Hungarian children in the same order are: 24% and 17%; 11% and 5%; 5% and 2%).

As regards the aggregate index for relationship to tasks, 55% of five-year-old Sri Lankan children, and 70% of six-year-old children achieved the optimum. The Hungarian data are similar: 51%, 71%. Ten per cent of five-year-old Sri Lankan children and 22% of six-year-old children require one year to reach the optimum. Two years are necessary for 12% and 3%, and much more than two years of learning are needed for 25% of the five-year-old and 3% of the six-year-old children. The Hungarian data in the same order are as follows: 17% and 15%; 13% and 8%; 19% and 8%.

On the basis of the social competence index, we can see that the Sri Lankan children, just like the Hungarian ones, differ from each other by more than $\pm$ 3.5, that is, seven years, not counting the 5% at each end of the scale of development (more exactly: 7.25 and 7.14 years). This

means that one third of the children entering school are more than one year behind the level of the average and three years behind the best 15%. The least developed 15% of children are more than two years younger than their generation as regards social development and more than four years younger than the most developed 15%.

There are some children in the first form who respond to momentary stimuli, i.e. the formation of their task perseverance has hardly begun and they require several years before being able to perform the given task persistently. At the same time, a considerable proportion of children can even achieve tasks lasting 15 minutes. And the situation is just the same with all the components of social competence. The problem as seen in this light is that school expects of about one third of children a behaviour that they have not yet mastered.

Traditional school is powerless, as it would be a sin to treat the majority of children as if they were on the level of the slowly developing third. Expectations of behaviour from the most developed 15-25% of children are, at the same time, generally lower than what is possible, so that they are retarding and have infantile effects. The one third of children with low social competence live in a constant state of failure because the expectations of behaviour are incomprehensible and impossible for them. Because of this, school, instead of developing these children's social competence, arouses and nurtures antisocial feelings. Thus the establishment of negative, antisocial habits and qualities, indifference to school, alienation, and even in some cases school phobia and deviant reactions take place.

These children usually live in an indifferent family environment of neglect, and a smaller proportion of them, in an antisocial, perhaps deviant environment. In the majority of cases, their social development is late for that very reason. So it does not mean that school produces children of low social competence, but it is unable to take into account the starting differences right in the first class: thus school in

fact increases these differences and spoils the chances of positive development.

2.4 The problem of calendar age

Up to now, we have examined the differences at school entry between children within one calendar year (generation) with regard to their biological-physiological, mental and social development. While children of the same calendar age (generation) can differ by a maximum of one calendar year (365 days), the difference between the same children can rise to between four and seven years on the different indices of development. Now we shall analyse the role of calendar age itself.

School systems usually accept children in the first form who belong to the same generation (let us disregard deviations from this which will be dealt with in 3.1). The question is what the differences within the same generation mean in terms of calendar age. Is it of importance in terms of successful school entry whether one child is six years and one month old, the next six years and six months old and the third six years and almost twelve months?

Let us suppose that we have measured the development of children who were born on the first and second of May in the same year from a particular point of view. If we calculate the average development of the children born on the first and on the second of May separately, we may ask the question whether there is a significant difference between the two. In other words, are children who differ from each other by one (calendar) day different as regards their development merely because they were born one day earlier or later? None of the different qualities we measured indicated that the difference between the average of children born on two consecutive days might have any significance.

The above fact can be realized without measurement, too, as no measurable change can take place in a

population within one day. The question is how big the lapse in time must be for a significant difference in development to appear. In theory, we can widen the interval. We can calculate the average of development of children born in two consecutive weeks, months or quarters to see when we arrive at a significant difference between the two averages. Real research and calculation along this line of thinking can be carried out in many ways. It is unnecessary to mention the methods here, as they can be found in the book to which we have already referred (Nagy, 1980), so we shall confine ourselves to demonstrating and interpreting the results.

Before entering school, children do not differ from each other within an interval of 56 days as regards their mental development, even if their calendar age in days is not the same. As regards their social competence, this interval is 73 days. As for the most different psychic systems that were examined, this threshold interval varies from between one and three months. (These figures were arrived at by computer calculations based on Hungarian data.)

As far as the magnitude of significant differences is concerned, children born in two adjacent quarters of a year differ from each other by 7% as regards their mental development, i.e. the older children are 7% more developed than the those born in the succeeding quarter of the year. If we consider the two extreme quarters of a generation, the difference in development is 24%. By doing the same calculation with two generations of five- and six-year-old children, we obtain a difference of approximately 50%.

These data show that the youngest children entering school (who belong to the lowest quarter) and the oldest ones not entering school (last quarter) do not differ as regards their biological, mental and social development because of their age, or this difference is negligible (7% at most). At the same time, there are differences of more than 200% in both samples between children according to the most varied indices of their development. Thus, some of the

children belonging to the last quarter but who do not enter school because of their calendar age are much more developed than the oldest ones admitted to school. At the same time, about one third of those admitted are considerably less developed than the average level of development of the oldest children who were not admitted.

The difference of 24% in development, however, between the oldest and the youngest quarter of the generation entering school is worth paying attention to rather than the 7% difference between the two adjacent quarters of those who enter and those who do not enter school. If the development of the children belonging to the two groups reflects their calendar age, then this is the sum of the difference between them. This is not inconsiderable from a pedagogical point of view.

If, on the other hand, the development of a certain child does not reflect his calendar age, the differences accumulate. If a child is, for example, 1.5 years behind his calendar age, this is not expected to cause any problems if he is one of the oldest of the generation entering school, for he is only half a year behind his youngest fellows in class. On the contrary, if the given child is among the youngest and has fallen behind by 1.5 years, this lag in comparison with the average of the oldest is already two-and-a-half years. Traditional school, which has not found an adequate means of articulation between pre-school and school and is unable to adapt when presented with differences between the children at school, cannot handle such a wide deviation. Therefore there is a high possibility of failure for such children which would put them at a disadvantage throughout their future development. At the same time, the possibilities which more developed children might have remain alarmingly unexploited in the sense of the above data.

3. PROBLEMS OF CONVENTIONAL STRUCTURAL ARTICULATION
(fixed age admission)

The data put forward in the previous chapter have shown that calendar age is the least sensitive index of differences in development between children. Within a generation considered to be of the same age from the point of view of schooling, there can be a difference of four years in biological-physiological development, five years in mental development and seven years in social development among those entering school. For the sake of illustration, approximate values might be used, whereby about one third of the six-year-old children entering school are more developed than the average of the seven-year-old generation. A third of those who are behind in development, however, do not reach the average of the five-year-old children. At the same time, one-third of five-year-old children are more developed than the average of those entering school.

The question arises why six-year-old children who are below the average of a five-year-old enter school and why five-year-old children who are more developed than the average of those entering school in both their biological, mental and social development, are not admitted to school.

The operation of the historically formed conventional mechanism of schooling and rigourous structural articulation are the causes of the problem involved in the above question. Therefore, in this short chapter we shall show the origin of the conventional system of schooling, and how its operation becomes rigid.

The existence of conventional structural articulation over many decades has had quite serious consequences. In the second part of the chapter, we shall mention the most serious of them.

3.1 Origin and characteristics of conventional structural articulation

Last century the proportion of those entering school multiplied in the industrially developed societies. Public education had become compulsory in more and more countries by the turn of the century, so that school entry and attendance became a legal requirement, subject to the force of law. The prospect of sanctions had to be held out against parents who, for some reason or other, did not want to have their children registered at school. In this way, the law had a real compelling or, at least, persuasive force. Sanctions can be put into effect only if it is exactly stated who is and who is not subject to obligatory schooling. So in countries decreeing compulsory education, the age for schooling was defined as well as the month and the day, and accordingly if the particular child had reached the stated age, he had to attend school. It became indisputable who had to and who did not have to begin his studies and whose parents could be punished.

Before compulsory education was decreed, the date of schooling was not set strictly. It depended on circumstances when the child began to attend school. This could be one year before or one to three years after the age favoured by custom. (This was, in the majority of countries, the age of six but in some it was five or seven.)

Making schooling compulsory for everyone by the force of law did not mean usually that all children were sent to and registered at school. In most countries, many decades, perhaps even over 50 years were needed to achieve a situation in which the registration of children belonging to the same generation became universal at least in the first form. (There are some countries even today where this process has not yet come about.) Though the process of registration in the first form was in the process of becoming universal, the practice of starting school earlier or later was still maintained, but its proportion gradually diminished as registration became more and more

widespread. Universal registration was achieved at last when nearly everybody entered school exactly at the set age.

Before schooling became widespread, usually it was the children whose parents could not afford it or did not find it important to have their children educated who did not enter school. The children of the most undeveloped levels of society stayed out of school for the longest time. Because of this fact those who were registered were recruited from a relatively homogeneous environment. The differences in development within a class were less extreme. When registration becomes universal in a country, the heterogeneous nature of pupils' development becomes extreme. The situation described in the previous chapter arises as the children come from all levels of society, bringing with them their differences in culture, preparedness and motivation.

With the realization of universal registration, school had to face a new challenge, namely the problems arising from the extremely great differences between students. In our century many attempts have been made to treat the problem (the most important will be analysed in chapter four), but the system of registration itself as one of the causes of the problems has become subject to examination only nowadays. The "cruel" operation of schooling, which has become a rigid legal requirement, has been shaken to some extent only by the removal of the handicapped and later those considered immature from the regular school system.

The earlier flexible structural articulation, which could adapt itself to conditions, has gradually become a rigid legal rule in which apart from calendar age other conditions (biological, intellectual, social development) are hardly considered. The separation of the immature and the retarded and the various programmes of compensation result from the fact that conventional structural articulation exists. They try to relieve its consequences. They attempt to adapt, and to fit the legally defined population entering

school and the individual children to the operation of the conventional system of schooling, instead of adapting the system itself to the differences between the children by developing an adaptive system of schooling and adaptive structural articulation. In chapter five we shall describe an adaptive articulation model built on such considerations. But first let us examine some of the consequences of the operation of the conventional system.

3.2 Main consequences of conventional structural articulation

As conventional registration admits children according to strict calendar age and disregards their biological, mental and social development, widely differing children turn up in the class and in the classroom. The curriculum, educational tasks and the teacher need to take these differences into account so that, despite the differences, each child can start from the point which coincides with his readiness. Despite numerous attempts made in this century, this problem remains practically unsolved. Many harmful consequences have been brought about by not dealing in the proper way with the ever-increasing heterogeneity of pupils at the start and in the subsequent stages of their school career. We shall here analyse three such consequences by way of illustration from the point of view of conventional structural articulation.

3.2.1 High repeat rate in the first grade

The rate of children dropping out is quite high, while registration is in the process of becoming universal. As the retentive power of school increases, the rate of dropping out gradually diminishes, but the rate of those willing to repeat a year for the sake of continuing their schooling increases, i.e. the proportion of repeaters grows, then levels

off and, finally, an extremely slow process of diminution begins.

In an analysis of the international statistics on repeating (see the Unesco year books and analyses, for example *The Statistical*...,1970) one of the most conspicuous peculiarities is the strong connection between repeating and economic development. The rate of repeaters in the first form is below 10% in European countries, while it is over 20% in the majority of African countries, but rates of over 30% also occur. In the space of several decades, parallel with economic development, repeating finally diminishes.

This link means that nothing much can be done about repeating, that it will be present and that we shall have to face its destructive force even after many decades. A number of researchers have sought the causes of dropping out and repeating. A study published recently, for example, examines the effect of 38 factors (*Coping with* ..., 1987). The majority of the factors studied and the treatment of the problem itself demonstrate an attempt to explain both the reason for the differences between children and what brings about the low results at school that lead to repeating. As the social and economic causes examined above change only slowly with the development of society, the conditions for successful learning will improve equally slowly, so that the above link is easily understood.

The problem, however, can fortunately be approached from another angle. Does not the error lie in the system itself, when its only response to the naturally extreme differences between children is to let them repeat? What is the point of repeating anyway? In the next chapter when we deal with automatic promotion we shall provide an answer to this question. Here we shall seek an answer from the point of view of the operation of conventional structural articulation.

The usual reason for repeating is that the pupil has not acquired the knowledge necessary for going on; without this he would not be able to keep up with work in the next

form. This seems to be true in the majority of cases, unfortunately. But if we take this view, we put the responsibility on the pupil: he has not wanted or has not been able to study as he was expected to, so nothing but failure can await him in the next form as well. It follows from this that the rate of repeating will diminish only if we have more hard-working, more talented and better prepared pupils. Socio-economic development, and the higher education of parents which this brings about, lead to a real demand for a higher level of children's education, too. The knowledge and the intellectual support of the family increase, that is, children bring more motivation from home, and this increases their diligence. The very slow decrease in the number of children repeating is due mainly to this, as well as to the improvement in objective conditions, to educational culture and to the slow development in teachers' preparedness.

The differences between children are not in themselves a cause of repeating: we cannot blame the children for those differences, and a small child cannot be held responsible for what happens to him during the year. External conditions are equally no direct cause, and in any case are unalterable. It remains to be asked why schools find repeating to be necessary. The answer is obvious: school cannot arrange to give children of low preparedness a form of education suited to their level; school cannot pay attention to the differences between children. The negative effect of this can be tolerated within certain limitations. The children who fail and have to repeat mark the limit of tolerance and the powerlessness of the school.

Repeating is nothing other than the failure of school, a forced homogeneity after the event. As the amount by which a child may lag behind in the course of a year reaches such proportions that it can threaten his advance in the next form and make a heterogeneous class totally unworkable, we remove such pupils from the group and put them back to a lower form. This is usually done in spite of the fact that at the beginning of the school year we can tell

for certain who will fail at the end of the term from our knowledge of the system of education and its educational culture. We register these children regardless year after year, make them struggle through the year and reject them at the end of the year, though their only "sin" or misfortune is that their calendar age is in accordance with the law while their biological-physiological, mental and social development differ from this considerably.

3.2.2 Determination of the children's future

The fact that children repeat the first form is only an extreme symptom of the failure of conventional structural articulation. The consequences have vital importance for the whole population. In the early 70's we carried out an experiment which was intended to answer the question of what happens to children during the first eight years of their schooling in relation to their initial level of development (primary school lasts for eight years in Hungary), i.e. we sought the consequences of the fact that they were registered in the first form on the basis of their calendar age without regard to their development. We retraced the school attainment of the population leaving school, i.e. of those leaving the eighth form, with regard to their achievement in all forms right back to the first. The analysis was carried out for all subjects separately, for particular groups of subjects and for general school achievement. The survey below covers only the last mentioned (Nagy, 1974a).

If we work out correlations using the data on achievement in succeeding forms, we can say to what extent the results of the previous form affect achievement in the next and later forms. All the coefficients of the correlation matrix we obtained are extremely high, except for some varying between 0.8 and 0.9. The situation is best expressed by the achievement in the first form and the eighth form.

The value of the coefficient describing this correlation is 0.86.

This means that the overwhelming majority of pupils progress in accordance with their starting level at school. If a pupil's starting level was low, he was very likely to be at a low level on leaving school too, and vice versa. We analysed the case of pupils in which a lasting change took place in comparison with the starting level. Our results show that in most cases a regression took place as compared with the starting level. In the case of far fewer children, a persistent improvement ensued (they are the pupils who suddenly grow very efficient; every teacher can remember such children by name, which indicates the rarity of the phenomenon).

We examined the connection between the continuation of studies and school achievement (gives up studies, becomes an apprentice, goes to a vocational school, or registers at a secondary grammar school in preparation for higher education). As the continuation of studies can only be built on good school achievement, it is only natural that the correlation between the result achieved in the eighth form and the continuation of studies is strong (0.73). For us, the important thing is that the correlation between the results of the first form and the would-be continuation of studies is just as strong (0.69).

These data show that the child's future depends, to a great extent, on his starting level: his lot is determined when he enters the first form. As we saw earlier, the extremely great differences between the starting levels of children are the result of conventional structural co-ordination; they are due to the system of registration that considers calendar age and not the children's biological-physiological, mental and social development.

Of course, I would not like to encourage the naive belief that if we managed to introduce a structural articulation based on development and not on calendar age, the differences in opportunity would cease to exist. The effect of the family environment and talent prevail through successive

school years. These can be counteracted only partially even by an extremely adaptive system of registration. The point is that the conventional method of registration precludes as a matter of course the possibility of equal opportunities just because of the extreme heterogeneity of the pupils. Adaptive articulation models can only help to offer equal opportunities at the start.

3.2.3 Obstacles to improvement in educational efficiency

It was realized long ago that school lags behind when compared to the rapid development of economics and society; it cannot update itself to the extent or at the speed required. The causes of this are not yet sufficiently known today. It is, however, an obvious phenomenon that most results of research, experiments and innovations cannot be put into practice. Those which can are confined to a small circle in the majority of cases or go through schools as fads. In other words, the opposition to innovation in schools is extremely great.

On the basis of my research, I have arrived at the conclusion that conventional school has in the course of centuries become an extraordinarily steady compact system which works in a routine way on the basis of quite simple, obvious principles. It groups pupils in classes according to calendar age (generation). As the differences in the particular generations - as we have already seen - are extremely great, these appear as the extreme differences within the classes. (The attempts to form homogeneous groups in different ways will be discussed in the next chapter.) We deal with the differences in a class as differences in talent and diligence, on the basis of which educational work is adapted to the average. Everybody faces average demands, which is "just" and "democratic". School is not to be blamed for the fact that the pupils, owing to their varied talent and/or diligence, answer in different ways the demands suited to the average.

Besides these well-known facts, not enough stress has been laid upon the extraordinary simplicity of the system and the fact that it can work comfortably and in a routine way and that its efficiency cannot be called to account. If we tailor the demands to the average, we assume that it is only possible to take the average as the basis, which means that there is an inbuilt conservatism. And we are not responsible for those who can fulfil average demands only at a lower level or for whom the demands suited to the average are not enough of a challenge, as the differences originate from the differences in their talent and diligence. This compact conventional model limits the efficiency of the system in advance, and its resistance to innovation arises from the system itself.

In our century, beginning with the trends of reform education, quite a number of ideas and experiments have been developed which have worked out a new type of school different from the conventional type, or have set out to increase the efficiency of the system. Even today there are countless ideas, experiments and innovations. Despite this, the overwhelming majority of schools work according to the conventional model all over the world. The reason for this seems to be the following.

Most innovations try to make improvements within the conventional model. In other words, they disregard the extremely big differences between pupils, and do not accept that they should adapt to them. These innovations are unable to produce any essential improvement, because through this disregard of the extreme differences between pupils and the average level of demands the range of methods that can be adopted is limited. The applicable solutions have been selected in the course of centuries of practice. If the particular innovation does not differ notably, there is some hope of integration, but in this case its effect cannot be important for that very reason. If, on the contrary, it differs essentially from what is characteristic of the conventional compact system, it cannot be integrated.

There have been a number of attempts to integrate solutions into the system which take into account the differences between pupils. They do not set out to replace the whole conventional compact system, but they try to integrate into it. The various solutions involving individualization, the short-lived programmed teaching programme and the like are of this type. Because these innovations touch upon the conventional system only at one or a few points, without reaching the critical mass of change which would transform the whole conventional system into one built on a new paradigm (which is not in any case their aim), they are discarded as elements alien to the system, they disintegrate or they are perhaps toned down to become unimportant and ineffective.

Finally, there are some innovations which could be mentioned as alternatives to the conventional system. The school of reform education known as the laboratory method and schools similar to it as well as recurring modern variations are of this type. But these innovations have not been able to spread widely up to now. I consider the reason for this to be that they cannot overcome the resistance of the conventional system. These alternatives, which base their educational systems on the differences between pupils, are essentially more complicated and require more work and a higher level of educational culture than the conventional system. They are somewhat more expensive, too, but costs are not so high as to prevent their spread. Besides this, I think, the most important obstacle is that they demand immediate changes which are too great and too radical for all but very few people to dare - or wish - to make.

From all this, the conclusion can be drawn that we should find points of attack which do not demand a radical and sudden alteration of the whole system but, at a given point, can bring about an irreversible alteration which takes the differences between pupils into account and tears down the obstacles in the way of increasing efficiency.

A suitable point of attack may be the so-called adaptive system of registration (see chapter 5). This operates at one point, that of entering school, an articulation model which works by taking into account the differences in development and not calendar age. It thereby makes it possible to carry out more effective educational work in the lower forms and, at the same time, it can prepare the ground for other alterations which could later help to form a school based on these differences and which could be more effective in dealing with them.

4. EFFORTS TO OVERCOME THE CONSEQUENCES OF ARTICULATION DYSFUNCTIONS

In the previous chapter, we examined the various ways towards a solution and attempts at development in the light of resistance within school to innovation. We could see two characteristic groups: one which took the extreme heterogeneity of pupils into account and the other which disregarded it. In the present chapter we shall analyse the practical methods, experiments and attempts to help to solve problems arising from extreme heterogeneity among pupils. Only those connected with starting school will be analysed, of course.

There is such a bewildering variety of practical methods and attempts of this kind that they cannot be dealt with unless they are grouped in some way.

According to our analyses, we found the most important aspect to be what happens to the child because of a particular type of solution. We accordingly set up four groups. They will be discussed under the following headings: selection, back-setting, adjustment and adaptation. All categories try to handle the differences in development of children before they enter school and of those who have already been registered. The analysis will be based on representative examples of solutions before and after entering school under the four headings.

4.1 Selection

About the turn of the century the most developed countries attained or, at least, approached universal registration in the first form, and for this reason extreme heterogeneity made its presence felt more and more. At that time the

view was generally held that *inheritance* defined exclusively or to a considerable extent what kind of pupil a child would become and what he could develop into.

From this view it obviously follows that if differences are inherited and inheritance defines the future of children in advance, it is useful to separate the different types of children. In the decades following the turn of the century, two well-known methods of selection became widespread: separating the mentally handicapped from the population entering school, and ability grouping, that is selecting children entering school according to their abilities.

Binet's intelligence test came about with the aim of helping to separate the mentally handicapped from normal children, so that they should not disturb the work of the latter. This solution can be regarded as a step towards the promotion of homogeneity which served the interests of the majority by removing those showing the lowest achievement from children of extremely heterogeneous development.

The separation of various kinds of physically and mentally handicapped children is a generally accepted practice throughout the world today. However, the demand to bring them up together with normally developed children is becoming stronger and stronger nowadays. Of course, the totally ineducable and those who need special training (e.g. the deaf-and-dumb) cannot learn together with the healthy, but the education of the mentally handicapped and of children with other handicaps is possible only if educational culture becomes mere developed than it is today.

In any case these children make up only 2-3% of the population. Extreme heterogeneity is not really caused by them. They did not even appear in the data published earlier. We may educate them either apart from, or together with the healthy, since the efficiency of school systems does not depend on them, although from the point of view of the social integration of particular handicapped children, it makes a difference whether they are educated together or separately. I myself would be in favour of educating them

together. This approach to heterogeneity has become less and less defensible in the 80's, or rather the efficiency of school systems and the factors determining the future of children in advance are not contingent on separating the handicapped or educating them together with the healthy.

At the end of the last century and at the beginning of this, ability grouping or streaming became widespread in England; classes formed in this way are usually referred to as homogeneous classes. The common characteristic of the many varieties of grouping according to ability and of the different ways it can be implemented is that the children are classified into two or more (more often three) classes on the basis of their actual development.

In terms of consequences, it is not important whether we think the differences are inherited or admit some other explanations as well. The point is that this kind of selection seems to solve extreme heterogeneity formally. Classes are more homogeneous than they would be if we organized heterogeneous classes reflecting the social structure of the neighbourhood. In this way, more effective work becomes possible, and everybody can be taught according to his possibilities and needs.

This idea made its appearance in some schools about a hundred years ago. In the first half of this century it spread widely in England but never became general. Since the 60's, the number of children attending such schools has been decreasing. Schools working on this principle occurred in the former British colonies too, but they have not spread widely elsewhere.

Why is it that homogeneous classes according to ability which offer, at first sight, a solution to the great problems arising from heterogeneity, have not replaced the system of heterogeneous classes? On the contrary: the number of these schools seems to be diminishing and it is not impossible that by about the centenary of their birth, around the year 2000, only a few examples will be found.

Educational literature has produced oceans of studies dealing with this problem and an indisputable answer

seems to have been provided to the above question (see, e.g., Lunn, 1970; Olsen, 1971; Postlethwaite, 1978; Evans, 1985).

The sociological consequences of this system have been the target for attacks from the beginning. Countless examinations have shown that "the children of people with low income nearly always end up in the lower class and the children of those with high salaries end up in higher classes" (Olsen, 1973, p. 179.) The same author, in the same work, evaluates the consequences as follows: "When we place pupils in classes according to abilities, we segregate them and form intellectual ghettos which parallel social ghettos, whether this ghetto be Park Avenue, or Harlem." Though many of these studies have continued to indicate reservations and even resistance to schools of this type they have not had any decisive effect; research into the effectiveness of heterogeneous and homogeneous classes has had great influence.

The number of researches and studies of this kind can be reckoned in their hundreds. Comprehensive surveys and research examining the problem in a complex way show that, on average, there is no significant difference between either the achievement or the effectiveness of the two systems. As for standard deviation, schools with heterogeneous classes increase the difference between students to a lesser extent than the system of homogeneous classes. In other words, both systems send out the population in the given country with the same amount of knowledge, and neither is more effective than the other. The system of homogeneous classes is more disadvantageous from the point of view that students starting at a lower level fall even further behind.

Why is it that the system which eliminates extreme heterogeneity is not more effective? Of the many explanations for this, "the biological law of returning to the average" and the fact that selection is layer-specific seem to be the most convincing.

If talented people always had talented children, a type of *Übermensch* would already have appeared. It is probably true that the upper levels of society represent a greater proportion of the intelligentsia and are more talented than the average population, as they have been selected and can keep their position because of their abilities. On the other hand, there are just as many handicapped children among their descendants as in other levels of society and more children with good or outstanding talent cannot be born because of the above mentioned biological law.

If a level of society is open, the variation in genes flowing in hinders this return to the average, but if it is tightly closed, processes of degeneration begin to operate.

All examinations clearly show that the selection of students is socially layer-specific. This means that not only the best end up in the most talented classes but children of weaker skills,too. Higher preparedness brought from home and stronger motivation can compensate for weaker inherited abilities to some extent.

So children who end up in better classes certainly get into a more advantageous position individually. But even here miracles cannot be achieved with the children of weaker abilities who are in these classes. So even they become heterogeneous, and their achievement, although it is on a higher level, is limited,too. At the same time, the extra knowledge produced by the classes of the most talented children increases in inverse ratio to that produced by those who were selected for lower classes. The main reason for this is that the motivation to learn, which is in any case lower, is destroyed by the fact that these children are classified as having lower abilities. That is how the general achievements of the two systems cannot become significantly different.

If we continue the above train of thought, it becomes easy to accept that homogeneous classes because of their layer-specific selection cut out the inherited stock of talent of the nation. Early selection reduces in advance the chance of selecting the most talented from among the widest range

of children. This is why more successful adults come from heterogeneous classes (as they draw from the whole population) than from homogeneous classes (which draw only from a narrow layer).

We would like to mention that elite schools which select from a wide range stand out from a lot of schools and have fewer of the problems of homogeneous classes. But it follows from what has been said above that the lower the age at which selection takes place and the higher the number of students who leave these schools to continue their studies at the highest level, the less chance there is of real talent being selected from the vast mass of the population, and the greater is the chance of damage and wastage of potential talent in the country.

So to sum up, we can state that neither selection before registration, nor after entering school can solve the weighty problems arising from the extreme heterogeneity of pupils.

On the contrary: ever more problems arise from this.

4.2Back-setting

The results of developmental and differential psychology have pointed out that differences between children of the same calendar age cannot be explained by inheritance alone but that differences in the speed of *maturation, biological-physiological growth and development* also play a very important role. Quicker or slower maturation is not, in general, the cause of differences in intelligence. If it were, the problem could not be dealt with by selection. The differences in development which occur because of the speed of maturation are not, of course, independent of the consequences of inheritance or of environmental effects. Nonetheless, an approach to the treatment of the problem has been formed in which consideration of the maturation process dominates.

If a child lags behind children of the same generation to a considerable extent because of his slow maturation, it is obvious that he should be given time to make up for his shortcomings. The various forms of back-setting solve this problem. With its help, children are given the opportunity to continue their studies with better chances for success even though they lose some time (usually one academic year); however, they become more mature and developed in the meantime. Two methods are stressed here: delayed registration and repeating a year after registration.

Examinations of maturity for school, used in many countries throughout the world and involving tests, medical examinations and/or the experiences of kindergarten teachers may delay the child's admission to school, usually by one academic year. Delayed registration affects only extremely retarded children in the majority of countries, at most 5-8% of the whole population. These children's chances of beginning school successfully increase and the extreme heterogeneity of those who are admitted to the first form also decreases, but not by more than six months according to our researches. In the first chapter we saw differences of four, five or seven years. In the face of these, delayed registration on the basis of maturity for school is an important part of the solution to the problem, as it has a diminishing effect of about six months, but the problem still exists in essence.

There are various options for the children who are kept back. Many people do not agree with keeping children out of school because if they live in an environment poor in stimuli (the majority of those immature for school are brought up in such an environment) they will not develop at all; at school they could learn something at least and would develop more in a year than in the family. If school really operated in such a way that it did not seal the future of these children, this would, in fact, be worth considering. Unfortunately, most schools cannot do anything with children of this type. Therefore it would not be useful to reject the idea of delayed registration at once, not even

when the child remains in the family (there being no kindergarten or other place where the child could be dealt with).

The most widespread solution is that immature children stay in the nursery school for another year. There are several kinds of "school kindergartens", the essence of which is that those unready for school are collected in a special class and given special training for a year. They are registered in the first form at the end of this year. A French experiment is also worth mentioning where immature children are taught in a class where the curriculum of one year of normal classes is stretched over two years, so that they study the material of the first class for two years. After that, they may enter the normal second form. The three possibilities can be understood without any further examples: the children who are unready for school either stay in the family for another year, attend a nursery school and take part in the normal programme, or have special training which results in a delay of one year.

Repeating a year is an extreme symptom of the failure of registration based on calendar age. It is a kind of backsetting which allows the backlog to accumulate for an entire year, then puts the student back to a lower form after his advance turns out to be hopeless and it is seen that he would hinder the work of his classmates in the next form. The assumption is that the child kept back will benefit more from repeating what he has already studied once than from going on into the next form. At the same time, his disturbing, hindering influence is less if he repeats the year.

The consequences and effectiveness of repeating have already been under examination for a long time. The results of the different research programmes are concordant. To demonstrate this, we have chosen an older example of research (Worth, 1960).

In a group consisting of a number of schools, pupils who failed had to repeat the class as usual. In another group of schools they were allowed to go on. After one school year, the extent of development by children in the

two different groups was assessed. The assessment covered twelve different fields. According to the data which were obtained there was no significant difference in the development of the children in the two groups. The difference was not significant in eight of the twelve fields. In three fields, a slight advantage could be seen for those who went on to the next form and in one field the repeaters seemed to be somewhat better.

From this it would follow that repeating makes no sense. And so the idea of automatic promotion, of a school with no failure was born. Unfortunately, the problem is not so simple, as the above data only show that neither form is more effective than the other. If this is really the case, why should children who have unsatisfactory results lose a year? But the research has provided another result,too: both groups attained, on the average, 0.55 class scores. As the general development of all the pupils in a year makes one class score, this means that the pupils who have unsatisfactory results have reached only about half of the average. So whether we make them repeat the form or go on, their development and results are extremely low. They will lag more and more behind and drop out sooner or later, or by passing from one year to the next formally, they will "grow out" of school and leave it unprepared for life. At the same time, they hinder the whole group and effective study in class. So neither automatic promotion nor repeating solves anything.

It is worth considering this view in the light of two points. Hungarian experiences - reinforcing similar experiences in other countries - show that it is more humane and more effective to have children repeat the first form (if there are no better ways in the particular country) so that it can be considered something like a probationary year. Children of very low development can take it as a breaking-in, preparatory course. They receive no school report at the end of the year. They begin the first form for the second time as if they had never attended school. No kind of administrative trace is left behind of the first year's

attempts. Parents support this solution whole-heartedly in Hungary.

The other experience is in connection with automatic promotion. In Hungary, there was a government programme to create schools with no failure. The experiment ended in failure. The main reason for this was that after a few years it became obvious that the effectiveness of school and the morale of teachers were lowered. Unfortunately it remains a fact that failing has a considerable effect in urging pupils to do more and its motivating force is important. This pitiless device seems to be part of conventional school, without which it is not possible to maintain even the traditionally low level. Repeating can be eradicated only if school works in a radically new way.

4.3 Adjustment

By the beginning of the 60's, the results of social psychology and socio-linguistics had reinforced the belief that the *environment* of the child had a decisive influence on his development. The extremely great differences between children could be explained by differences in the cultural medium of the environment and especially in that of the family. If this was the case, then backwardness could be corrected, extreme differences could be diminished, and equal chances of beginning school successfully could be given by changing the effects of the environment, by enriching it and by more intensive study. All this coincided and was linked with the practical aim of creating a welfare state and with the actual steps taken.

The concept of school readiness, which expresses the above view, developed and spread. In the 60's and 70's, a vast international movement was formed which undertook the task of preparing children before they entered school and aimed at compensating for the shortcomings of those who would be at a disadvantage in school. We shall analyse the main characteristics of preparation for school and the

corrective methods used in the first forms of school by drawing on the extraordinarily varied and extremely rich programmes which have emerged throughout the world.

At the end of the 50's, there were hardly any countries like Belgium, Israel or the Netherlands, where the rate of those attending nursery school was above 80%. Even in the United States only a small proportion of three to four-year-olds went to nursery schools, and only 64.3% of the population of the five-year-olds went to pre-school (*Organisation...*, 1961, p. 275). If the environment has a decisive influence on the development of the child, those who have not attended nursery school are already at a disadvantage because they have been deprived of the educational effect of one of the most fundamental environments, the nursery school.

When the consequences of all these circumstances were summarized, a kind of shock ensued in the education policy in many countries. The development of a network of nursery schools was accelerated and preparatory programmes for school quickly spread for those not attending pre-school.

The first and most spectacular appearance of these movements was the Head Start programme in the USA at the beginning of the 60's (Jones, 1967). A kind of political hysteria arose to bring to an end the drawbacks of children who had not gone to nursery school and were at a disadvantage: this bore the slogan of democratization. Even the then president became involved. A huge movement was born, vast financial forces were used to help the cause, and thousands of preparatory courses were organized with all kinds of content and character.

The Head Start programme (like similar but not so ambitious programmes throughout the world) was not able to fulfil the ardent hopes people had of it. From both political and educational points of view, it suffered an ignominious failure. The expectations were too high, and the pressure of the political campaign did not give enough time for preparation and for the training of teachers. The

essence and moral of the problem lies not only in the fact that education cannot be developed through political campaigns and that "vitally urgent" educational campaigns do more harm than good, but in the fact that keeping the children occupied for a few weeks or months in an environment richer in stimuli or making them stay with other families for some months cannot replace a one to tree-year period in the nursery school. But it is even mere unrealistic to expect that preparatory programmes for school and similar actions can make up for the one to three-year backlog and that the extreme heterogeneity in development can be reduced significantly.

Preparation for school, freed from illusions and absurd expectations, has served and can still serve us well, despite its failures, by making children accustomed to school and by letting them get to know school life, and it can have great influence on the social development of children. In the field of mental development, however, we cannot obtain results worth mentioning. On the contrary: we can arouse negative feelings against school through enforced exercises suitable for school only. These conclusions are still relevant in developing countries today, but in the more developed half of the world, the kind of preparation intended to replace nursery school has lost its role, since attending nursery school has become the norm mainly in the year preceding school.

The question of the preparatory function of nursery school remains. If nursery school and pre-school become more general, but ignore the differences between children, they will not diminish, but will enlarge the differences. The question is whether nursery school can help children who lag behind and can prepare them to fulfil the demands of school successfully. By dealing with children individually and in a differentiated way, educational work may help the development of those who have fallen behind, but we should not entertain great hopes. The fact that these children are more than 1-1.5 years behind in development cannot be diminished if we spend the same time on them as

on other children. On the other hand, we can achieve remarkable results if we organize separate activities lasting for 10-20 minutes for the children in the nursery school group who are the most behind (story-telling, play exercises, etc.). In the next chapter, we will expound the Hungarian experiences in this field; here, we merely refer to the positive effect of this possibility.

Different methods have been devised to help students of low ability, slow maturation and/or low preparedness to advance and avoid failure after entering school. Of these, coaching, supplementary activities, group teaching, individualization and the like are quite widespread. These methods, however, start from the notion that the shortcomings in knowledge needed to fulfil the demands of the curriculum should be made up entirely. These methods can be effective in making up for shortcomings arising from illness or some other cause and in helping pupils who are only a little behind the others but need more explanation and a longer time to understand and master things (they might very well be geniuses, as many examples can be given of slow learning even on the part of the greatest members of mankind).

But the problem of children who are one or more years behind their fellows cannot be solved by activities and methods like these. This work is Sisyphean both for the teacher and the child. In the case of these children, it is not the demands of the curriculum which should be enforced but the development, knowledge and activities on which the material involved in the curriculum can later be built up through remedial classes.

If Hungary, for example, at the end of the 60's it was the practice to place less developed children in remedial classes containing only a few pupils, at most 10-15 (Szabó, 1969; Papp, 1972). Here, by creating especially advantageous conditions and inserting a preparatory course, teachers tried to make up for what was lacking and to fulfil the demands of the curriculum at the same time with especially intensive educational work. The basic idea is obviously that

children who are behind in development will do more if they are treated with special care than they would if they started their school career in the same class as their fellows.

The initial results seemed to bear out this assumption. In the 1970/71 school year in a study conducted in Budapest, 155 pupils completed the first form successfully and went on to the second form of normal classes out of 212 students in 16 classes. On the basis of the initial positive results, remedial classes become widespread, but ceased to exist fifteen years later. The main reason for this may well be segregation. Parents felt that a stigma was attached to their children being placed in a class and more and more people became averse to accepting such segregation. At the same time, the gain in knowledge was not always commensurate with the loss and, in some cases, psychic damage in the children's development occurred through this segregation and the rejection of other children.

4.4 Adaptation

In the above sections we analysed methods which attempt to solve the problems of extreme differences in development, the cause of which is that students are expected to meet equal demands at school as they advance with the class. This is a conventional school system working with classes which advance together, in which the whole class deals with the same subject all the time, and where you cannot fall behind or advance (only at the end of the year is it possible to step back one year by repeating, and in some school systems it is allowed to skip a form). In this system - as we have seen - the starting differences in development cause deep and decisive consequences. In the case of classes which advance together it is thought possible to make children able to fulfil the demands suitable for the average. That is, *we try to adjust children to school and not the school to the children.*

The solutions we have examined up to now aim at enabling children to progress largely together. In a sense, classes formed according to ability seem to be exceptions to this, because students selected for different classes do not advance together as compared to each other. The compulsion of advancing together still exists within the particular classes. In fact, selection takes place so that working together may be more successful in the more homogeneous classes obtained in this way. We could see that from the view of the effectiveness of the whole school system, this way of organization did not bring about any solution.

Now we shall analyse the possibilities of adapting the school to the children and to the differences between them. Here, too, we shall consider two fields, the system of registration, that is, the articulation between school and nursery school, and family. As one of the main themes of our book is precisely the introduction of an adaptive articulation system of registration, we will deal with this subject in a separate chapter. The attempts which try to find a solution to the differences between children in school and which attempt to take into account the differences in rates of learning, will be discussed briefly in this section. This is necessary so that we can see the outlines of the alternative school, of which the adaptive system of registration is only a component.

We have mentioned earlier that even reform education sought possibilities of adaptation to the differences between students. From this point of view, the most remarkable organizational solutions are those which operate in a way similar to the system known as the "laboratory method" (there the groups and classes are not organized on the basis of age but the pupils can be recruited for a particular aspect of a subject). An important and useful principle arises from experiments of this kind: the *principle of level achieved.* In other words, the groups should be formed not on the basis of ability, talent, maturity, etc., but by reference to the point to which a particular child has actually advanced in a certain subject, bearing in mind his

own ability and competence. If we take another subject and another skill, he may belong to another group or class on the basis of the level he has achieved. This principle makes sense and is humane and democratic. The only problem is that the structure and operation of such schools are extremely complicated. This is one of the basic obstacles to their becoming widespread (further problems need not be enumerated here, we only wished to point out a principle which seems to be useful).

The *principle of individual treatment* is a milder form of individualization which tries to introduce as much individual teaching and as many exercises suited to the individual as possible into a class which advances together so that, among other things, advancing together may be as successful as possible. This principle is therefore an important, indispensable educational means (and can be a useful element in an alternative school,too) but the experience of many centuries shows that by itself it has only a small influence on the problems arising from extreme differences.

This type of individualization, which allows advance at the individual's speed (at one time programmed teaching, and personalized education promised to realize this - Keller, 1974 - as did many other movements with the same aim), leads to the disintegration of the class into its individual members, and the teacher would have to deal with all the pupils at the same time separately, which is impossible in practice. Both the teacher and the pupil are at the mercy of the means which makes individual learning possible. The smaller the child is, the more serious are the consequences of reducing to a minimum the personal contact between the teacher and the pupils. At the same time, the students become alienated from one another as well because of the individual speed of progress. It is not mere chance that individual education has not been able to spread generally as an organized system. Rather it is realized for a certain theme or task and only for a short while, temporarily, while the whole class in the end

this form it can be regarded as a modernized variety of individual treatment.

Behind individualization in the above sense lies the *principle of advance at the individual's speed*. This principle would radically solve the problems arising from differences between children if it could be used successfully. Unfortunately, it cannot become a real alternative for co-progressive education (where the whole class progresses together). At the same time, advancing at the individual's speed as an actual alternative to co-progression involves a more general possibility: the *principle of not advancing together*. This principle does not say that education should be individualized in the sense that each pupil can progress at his own speed for the sake of solving the problems of differences between pupils but only that the whole class *need not* advance together.

The so-called open plan schools have a large community of pupils (one or perhaps more traditional classes of 30-65 students) placed in a space that can be divided freely into spaces for groups. These groups deal with different subjects, so that the whole class could not in fact work together anyway. Co-progression takes place in these groups. But this well-known movement has not been mentioned only to illustrate the principle of advancing separately: we would like to show a solution where a large group lives together and works together on certain activities and finds a way for its members to communicate and cooperate but, in spite of this, is not a conventional co-progressive class.

This is attained by creating a class separated into two structural levels (to be explained later). This is not group education in the traditional sense of the word, for it can work within co-progressive classes too, but it is an alternative way of organization with the class separated into two levels. In classes built on the *principle of separation into two levels* remarkable results can be achieved as regards adaptation to the children's actual preparedness, thereby increasing the effectiveness of education. The general

spread of open plan schools cannot be hoped for, however, because most of them require special buildings, material conditions, and, furthermore, operation is made difficult with so many pupils and complicated organizational tasks.

The starting point of the non-graded school (Goodlad and Anderson, 1959; Miller, 1967) is the eradication of repeating by seeking an alternative to the institution of the school form. It attempts to get rid of the impossible situation where shortcomings must accumulate for an entire school year before something can be done. The curriculum is divided into school years artificially, and this material cannot be taught in either less or more time. That is why a definite interruption, failure, must be used every year, because ignoring the differences between pupils so conspicuously necessarily leads to failure. Non-graded school, therefore, does not limit advance by school years. The pupils, or their groups within the class can advance continuously independently of the arrangement of classes. In practice, this means that, for example, by the end of the first form there will be some students who have mastered half of the demands of conventional school (but they have, at least, learnt that) and there will be some other students who are already working on the material of the second form. Generally, a period of 2-4 years is considered a unit. At the end of this, of course, pupils "slip" into the next phase expressed in school years. The majority need as many years as there are in the phase normally. A smaller number enter the next phase one year earlier and others one or two years later. Non-graded school has not been able to establish itself for reasons that need not be discussed here. It is still worth considering because of one of its important principles. This is the *principle of "continuous progress education"* which was expounded by Maurie Hillson in 1967.

Schools functioning in small settlements cannot organize classes because of the small number of children. The pupils of 2-6 classes sit together in a class and groups are formed within this. Traditionally, classes are formed on the

basis of calendar age, but these groups are, in fact, classes within the class. Educational work is adapted to this situation as well. When the teacher deals with the students of a class, he does the things he would do with a conventional class as a matter of form. In the 70's various researches were carried out in Hungary which showed that children could reach considerably better results in the first three years in these non-graded schools than in graded village schools, despite the fact that they were at a disadvantage from several points of view. Their results, expressed in time, are one year better.

In looking for reasons, we find two important elements by which the work done here differs from the work of graded schools. While the teacher is dealing with the students in one "class", everybody else has to study and practise alone. This is an enforced element of the system. Individual work is only a methodological possibility in graded schools: teachers use it only on certain occasions. The other peculiarity which adds to the value of this form of school is that the number of members in class groups is usually between three and six.

This means - if we disregard the child working individually - that the teacher is dealing with a class of three to six pupils. A micro-class of that size is radically different from the traditional class of 15-40 members, but it differs even from a class of 8-15 pupils, which can be called a small group. If the number of pupils is below seven or eight, the relationship between the teacher and the pupils can vary in quality, be personal and individual, and hence offer stronger motivation and more effective education.

At the same time, according to the Miller law, man can deal with 7 ± 2 things and still consider the elements as separate items (Miller, 1968). From the sociological and educational point of view this means that the teacher can adapt his work to the differences and peculiarities of particular pupils in a class of three to six children.

Within the foreseeable future we cannot hope for a reduction in the number of children in classes to the extent

that teaching in micro-classes becomes widespread. On the other hand, the *micro-class* as a principle of organization may be an important factor in the alternative school in its process of taking shape.

The mastery learning movement (see, e.g., Block, 1974) has also added an important principle. Conventional school sets what is to be taught and done at school in a given school year. Because of this, a vast proportion of students master only a fraction of the material. Mastery learning, in contrast, prescribes that what is taught should be mastered by everyone. This is, of course, only possible if we differentiate the time to be devoted to it in accordance with the differences between pupils. Slow learners can have more time and quick ones less. The essence of this is that nobody can stop studying the given theme or skill until he achieves the criterion of mastery. This is the *principle of teaching to criteria*.

It can easily be understood that if we wanted to teach everybody everything up to the relevant criterion, we would get into serious difficulties because of the differences between pupils. If we were to consider the possibilities of the best pupils, and if we suited the material to be taught to their level, the weak would attend school until they grew up in order to master all criteria. On the other hand, if we suit the material to the slow students, we produce curriculum minimalism and the potential of the generations which are growing up will not be exploited.

For this reason it is of vital importance that we should consider another point of view, that of *demand differentiation*. As regards the material in the core curriculum which is compulsory for everyone, we suggest teaching to criteria; these can be differentiated so that we can assess the different times needed and the quick pupils can utilize to the full their potential and abilities by doing extra work and tasks.

We have analysed various methods which attempt to adapt one or more aspects of school to the extreme differences between pupils. We have stated a characteristic principle in each of them. This does not mean that only one

principle does or may underline the adaptive attempt we have analysed. On the contrary: I have just attempted to show that nowadays an alternative school is being outlined which organizes the principles of the adaptive attempts into a system, and at the same time, augments them so that the pupil may be able to fulfil the demands of education.

5. AN ADAPTIVE ARTICULATION MODEL

In the previous chapter we saw examples of how to deal with the severe consequences of conventional structural articulation from different points of view. Their common characteristic is that they seize on one or more problems, raise them to the level of an aim, overgeneralize them and expect from them a solution to all, or at least some basic, comprehensive problems of school. The programmes of selection, preparation and compensation all do this and so do non-graded school, etc. In any case man always tends to overgeneralize every worthwhile idea or hypothesis. This leads in the end to a thorough exploitation of the possibilities and then to a recognition of the limits and a seeking after new trends.

We saw that attempts to find solutions to the problem do not just mean testing and rejecting one new hypothesis after another, even though the chronological order of the various attempts as each new idea succeeds the previous one, reinforces this impression. But this process of accumulation also has an aspect of structuralization and systematization.

For the lower forms in school, we attempted to consider in chapter four the most important developments which, at first sight, do not belong together, or at most do so very loosely; despite this it would be possible to organize them into a system today and on this basis alternative models could be worked out for traditional school.

But as this is not the subject of the present book, apart from this account of the elements, we shall not examine the possible models.

These various attempts to modify the system of entry have, as we have seen, reached a critical level of accumulation on which complex alternative models can be worked

out, in contrast to the conventional entry system. We shall now present such a system in this chapter, the adaptive entry system initiated in Hungary. (Cf. First Law on Education in 1985 and the Decree on Compulsory Education No.6/1986.MM. In: *Az óvodai...*,1986.)

Of course, there are many possible alternative systems of entry depending on the traditions, peculiarities and possibilities of the given country. There are, however, some critical components, without which the conventional entry system gains ground again. We shall pay special attention to the characteristics of these components.

5.1 Structure and functioning

The most important question of registration is to decide who is and who is not to be registered and on the basis of what criteria. The conventional entry system is built on calendar age, that is, on the *principle of age*, by defining a year, a month and a day. This "watershed" is the criterion for registration. Whoever has reached a certain age by the given day, will enter the first form; anyone who has not, may start school only the following year.

In Hungary, the age of six has to be attained by the first of September in the conventional system. This forms the structure of the conventional entry system, on the basis of which its operation, i.e. the intake of pupils once a year, is realized. Moving on year by year defines the structure of advancement in the system.

We analysed in detail the entry system built on the principle of age in the earlier chapters, then the serious negative consequences of the operation of the co-progressive principle. We also saw that in this century more and more elements which are alien to the system are incorporated (e.g. the exclusion of those unready for school), which means that universal intake according to age cannot be realized. The basic structure and operation of the system remain essentially unchanged and maintain their negative

consequences which can be alleviated only to a modest extent by attempts at modification.

So the question is obvious: should not the principle of age itself and the basic structure appropriate for this and its operation be questioned? Is it possible to create a basic structure according to a principle and an appropriate operation which are based on and can be adapted to the extreme differences between children? The answer may be that the adaptive entry system offers an alternative solution, based on the *principle of development.*

The main condition is that we should be able to evaluate the children involved in the entry system in some way. This subject will be discussed in the next section. For the present let us suppose that this condition is given. In this case the next question is which children should be involved in the entry system.

According to the conventional system, all the members of a generation are involved. If only these children may be considered, there still remains the problem presented earlier of why children are not admitted who are a few months younger than the youngest registered ones but are more developed than their average, perhaps even attaining the average of the best third.

If we want to solve this problem, we should abolish the entry system based on the principle "one generation=one class". Of course, the point is not that we should allow all ambitious parents to have their children (whom they believe to be geniuses) registered in school one year earlier, as is possible in many countries. This does not affect the essence of the conventional entry system, but is only an exception to its normal operation. *The solution to transforming the whole of the system is to define an interval longer than one year.*

Before analysing this question in a more detailed way, we would like to note that the custom of having children register at one point in the course of a year can also be questioned. Registration twice a year seems to offer valuable advantages. This can be considered, however, only

if a suitable kind of streaming is also introduced into the school system. Perhaps it may extend only to some classes, at the end of which some kind of equalization measures are necessary so that registration once a year may become possible in the next phase. Or perhaps multiple intake (registration several times a year) would lead to a school where compulsory co-progression of pupils would cease and differentiated progress would be possible. Since nowadays schools of this type exist only as experiments we shall consider here the alternative entry system involving intake once a year. These models in any case can easily be modified if the demand and possibility for intake more than once a year arise.

The essence of alternative schooling is that we define more than one generation, and who may and who may not enter the first form is decided on the basis of the development of the children. In this way, the problem of a (differentiated) intake based on development is solved. The following two varieties are possible and they can be applied together.

In the first variety, the age of the entry generation is extended downwards. For instance, if we have registered six-year-olds in the first form up to now, we will examine the development of six-year-olds and younger children (e.g. five-year-olds) in the future and we will choose the entry group from these two generations. In the second variety, the age of differentiated progress will be extended upwards.

We mentioned an example in the previous chapter where the entry generation is put together with older children, and differentiated progress is realized within this framework. Those who progress quickly enter the next grade, thus gaining a year, while those who progress slowly lose a year. Solutions of this kind can be regarded as the antecedents of the second variety. Since, except for these antecedents, we have no knowledge of a fully developed and tested system of this variety, in the following we shall limit our discussion to the first variety.

If the essence of the structure of the adaptive entry system is that it extends the age of the entry generation

downwards, thus making an entry age group, first of all we should make clear how wide the optimal *age interval* can be. Secondly, we should examine how the model created in this way works.

As far as the *age interval* is concerned, it depends basically on the development processes occurring in the population. For instance, as regards writing movement co-ordination, a few children in a thousand can be found in whom the optimal mastery of this skill has already taken place at the age of 3.5. The rearrangement of the population starts at this point. This process takes place according to a logistic graph which characterizes general development. Among children of higher age groups the number reaching optimal mastery increases only a little. At the beginning of age five, the number of children who reach optimal mastery increases quickly, and this quick regrouping process ends at about the end of age six. Then about 85-90% of children over six have reached this level of development. The others' learning process drags on.

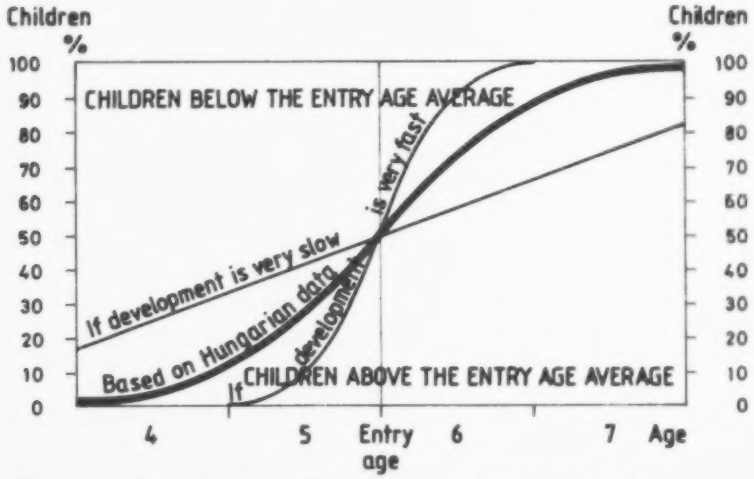


Figure 1. Structure and Functioning of Adaptive Entry Systems: Speed of Children's Development

On the basis of this example, we can imagine a *regrouping process* of the children's population *according to development*. In the upper third of the illustration here we try to show how large an age interval could be usefully defined for the adaptive entry system in the case of different rates of regrouping. (On the method of calculation see Nagy, 1974b.)

We have indicated three lines in the graph shown in Figure 1. The line intersecting the drawing vertically in the middle marks entry age (this is six years in Hungary). To the right of it are those who belong to the entry group or who are even older, and to the left are the younger.

If the children's regrouping according to development took place as indicated by the lowest line on the left, an interval of $\pm$ 6 months would be useful, as only a small percentage of children among the younger ones have reached the general level of development of those who belong to this interval. At the same time, only a small percentage of the older children have not yet reached this level. In this case, the entry system using the "one generation = one class" principle would be optimal.

If, on the other hand, we take the line illustrating the other extreme, an entry system would be appropriate which would make the admission of four-year-old children possible, but would not let all the eight-year-old children enter school. The bold line in the middle shows the Hungarian children's regrouping according to development (in other words, the population's development and learning processes) and the data obtained by assessment.

According to this, the optimal interval of adaptive entry system in Hungary could be $\pm$ 1.25 years, i.e. 2.5 years. In this case, only a small percentage of extremely developed and some handicapped children would fall outside the range of this model. (The Sri Lankan data show an interval longer by a few months.) For simplicity's sake, however, it is useful to choose an interval of two generations. This suits the entry system of admitting children to school once a year.

This simplification means that at least 10% of children fall outside the range of the model at each end: these are more than one year older than the entry age but do not reach the average development of those who are in the entry interval, or are more than one year younger, but, despite this, are more developed than the average of those in the interval. The registration of these children who are more than one year younger can be questioned from many points of view in spite of the data from measurements showing extraordinary acceleration. The older, retarded children, however, were within the range of the model a year earlier and it is highly possible that they attended pre-school for another year in the meantime.

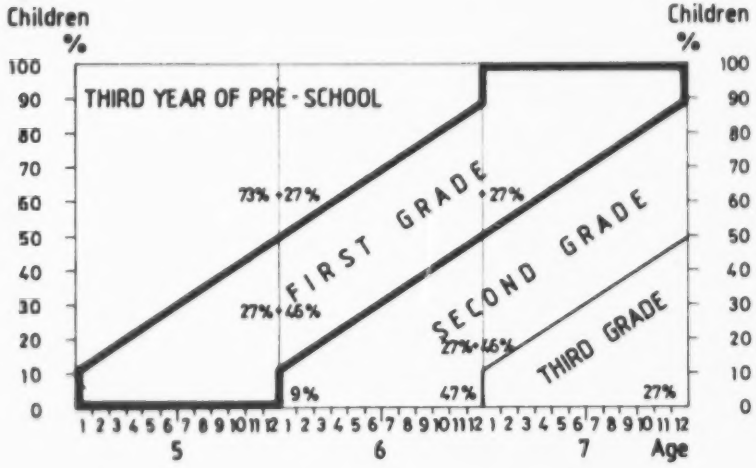


Figure 2. Structure and Functioning of Adaptive Entry Systems: Adaptive Structural Articulation Model

Figure 2 shows the *theoretical operation of the model with an entry interval of two years.* As can be seen, 27% of five-year-old children can start their studies on the basis of

their development. On the other hand, 27% of six-year-olds remain at pre-school because of their low development; 46% of six-year-olds enter the first form in accordance with their age. The consequence of the operation of the model is that children of three generations are registered in one form: 27% of seven-year-olds, 46% of six-year-olds and 27% of five-year-olds. That is, instead of the "one generation = one class" principle, "one class from three generations" prevails.

In any case there are also several generations together in one class in schools working according to the traditional principle, but they lead to a severe burden both for the individual and the class.

We showed earlier that differences in calendar age within one generation also play an important role in starting school successfully. This is expressed in the operation of the model by nearly half (47%) of the oldest five-year-olds (5 years and 11 months old) becoming members of the first form while, at the same time, only 9% of those aged five years and a few months do so; 47% of the youngest six-year-olds (six years and a few months old) stay at pre-school, but only 9% of those aged 6 years and 11 months do so.

Let us enumerate the *consequences of the operation of the model.* In accordance with what was written in the previous paragraph, the problem arising from differences in calendar age within a generation is corrected.

As the less developed six-year-olds have gone to pre-school for another year, they are one year more developed through natural development. That is, they have made up one year of their lag in comparison with the other children in the first form (some have made up more, some less). Because of this, their chances of starting school successfully have increased considerably; in this way, their later achievements at school are not determined by their retarded development (cf. what was said about this in the previous chapter).

The five-year-olds who enter school will meet activities suitable to their development. If they entered school one year later, the curriculum suited to children on a much lower level would retard their development.

The extreme differences in development between first form pupils are considerably diminished, which makes educational work easier and more effective. To imagine what "considerably diminished" means, let us follow the train of thought below. Earlier we showed that disregarding the 5% of the extremely developed and the 5% of the underdeveloped, among the remaining 90%, the greatest difference in development is five years. This is an interval of approximately ± 2 (standard deviation). Expressed on the standard scale, $2:5 = \pm 0.4$ (standard deviation) = one year. Now, if we exclude the 27% of the developed and the 27% of the less developed children from the entry generation, in accordance with the operation of the model, the interval of the difference between the remaining 46% of children of general development is ± 0.88, of standard deviation (according to the frequency function of the normal deviation), which is equivalent to a heterogeneity of 2.2 years. If we really let the most developed children from the younger year enter the first form and if those who were held back a year earlier have really developed one year in pre-school, then registering them together with the 46% of children of entry age, does not fundamentally change the two years' heterogeneity in development. (Of course, the 5% of the handicapped and the 5% of the extremely developed children should be treated as special cases which would scarcely fit in any model.) *So in theory, the operation of the model reduces the traditional 5 years' heterogeneity to 2 years.* This can indeed be called an important decrease.

The question is how much of this theoretical possibility can be put into practice. This depends basically on two things. Firstly, what shape the model takes under local conditions, and secondly, how effective its actual operation is. Now let us examine the Hungarian form of the model and the effectiveness of its operation.

Figure 3 shows the *structure and function of the Hungarian model.* Its most characteristic peculiarity is, in comparison with the general model analysed above, that only those who will attain entry age in four, or at most seven months, and provided that they are sufficiently developed, enter the first form after pre-school. (The rate of less developed children who are held back at pre-school is close to the 27% of the theoretical model: 25%.)

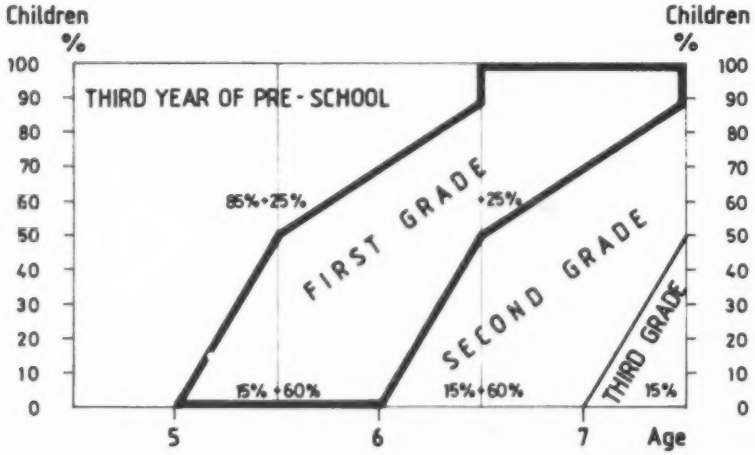


Figure 3. Structure and Functioning of Adaptive Entry Systems: Hungarian Version of the Adaptive Structural Articulation Model

The cause of the above peculiarity is that many people were afraid of registering younger five-year-olds. They were worried about overburdening them and possibly making their situation disadvantageous later, despite the fact that they are more developed than the average of the six-year-olds. As this anxiety would be difficult to remove, and the parents would not be easy to convince in the debate surrounding the introduction of this system, some special

precautionary steps had to be taken. The new law raised the entry age by three months. Earlier those children could enter school who had completed their sixth year by the first of September; according to the new law, those could do so who had turned six by the first of June. As a result of this, the majority of those who can start school earlier on the basis of their development can be chosen from children of pre-school age, who would have been obliged to start school in the previous entry system.

Thanks to this cautious approach the introduction of the model did not meet opposition. Neither psychologists, educationalists, teachers nor parents raised any arguments in rejection. The cost of this toned down variety is that the heterogeneity of the first forms can be reduced at most to 2.5 years in the Hungarian model, instead of the 2 years calculated in theory. In my opinion it was right to take this risk for the sake of its successful introduction.

Actual operation has started in all towns and villages in Hungary in the first year, but the range of the model has been even more restricted in many places. Those who adopted a restricted model were encouraged to do so by the preliminary debate and the information presented in educational literature: they were warned to be very careful about making younger children enter school if conditions were not satisfactory in the relevant pre-school. (The positive attitude of teachers and parents might be rather debatable, or it was not quite clear what should be done or how things should be carried out either because they did not take part in the course introducing the model or because the course was not appropriate.) Perhaps, it was felt, younger children should not be registered at school in the first year of introducing the model. In some cases the new system should be started only a year later. Different *types of application* have arisen because of these doubts.

In many places the operation of the model was restricted to children who were involved in the new entry system because they were born in the summer. Some of the

children born in June, July and August were admitted to school, others were not.

In some other places, exemption was not restricted to children born in the summer but extended to the whole entry generation; however, the number of those who were held back at pre-school increased only a little due to the effect of a selective system which had been working for many years (when the proportion of children who were not admitted to school because of their immaturity was at most 5-8%).

In other places again, the proportion of those exempted has reached 20-30%, but the possibility of admitting the most developed and oldest children of the younger generation is not made use of or, if it is, it amounts to only a small percentage.

The full exploitation of the potential of the model has been realized only in a few areas today. Research has not produced appropriate results of the working of the new entry system after its introduction. We do not know the exact number of the above varieties of application. We only have information given at certain forums by various inspectors. More serious follow-up research will be worth starting only in one or two years'time, when considerable experience has accumulated.

Therefore it is extremely difficult to estimate the effectiveness of applying the model from the point of view of diminished heterogeneity, and it is practically impossible as regards the school career of the retarded and those admitted earlier (for information on this we will have to wait for several years). As far as the reduction of heterogeneity is concerned, the extreme differences in development of the conventional entry system which went up to 5-7 years have been reduced to 3-3.5 years in the first form, as far as we can estimate, as the result of the present state of application of the new entry system.

Apart from restricted application, a new positive development has also appeared which was not in the original theoretical model. To be able to admit the most developed

children from among those who are younger than the entry age, we must, of course, examine and select them a year before letting them enter school. On the basis of this examination, the less developed can also be clearly recognized. This has lent support to the conviction that less developed children should be held back not just before entering school but a year earlier.

The reason behind this is mainly that children consider it failure and frustration if they cannot enter school together with their fellows. Retardation one year earlier does not cause frustration.

This is not least because children who are a little younger than three can be admitted to nursery school and can stay there for four years. Nursery school consists of three years, and those who repeat usually spend two years not in the last grade but in the middle or perhaps the first one. Holding them back in the middle grade is more advantageous because the programme of the nursery school is much freer here than in the last grade, which can be called pre-school.

Though we do not have any reliable research data on the application of this new element either, we can state that it is spreading quite quickly, leading to a better exploitation of the possibilities within the new model. As less developed children can still be held back without the risk of frustration, the number of these children can rise. Moreover, children who were not held back in the middle group can still be held back before going to school, if it becomes obvious that they have not reached the level needed to enter school successfully. The risk of a mistaken decision is thus lessened considerably.

The selection of the handicapped took place in two basic ways in the conventional entry system. Those who were completely untrainable and who could not be instructed in local schools were sent to institutes of special education. They could not go to pre-school or nursery school, either. The other method applied to the slightly mentally handicapped who are greatly retarded

intellectually. They were admitted to the first form and when they proved unable to progress with their fellows, psychologists examined them thoroughly and decided whether they should continue their studies in a special school or class for the slightly mentally deficient. Resistance to this removal procedure grew for several reasons.

A new approach to the problem of selection of the mentally deficient was presented by the new entry system, too. If the less developed are kept back in the nursery school or pre-school, we can acquire a good deal of experience during that extra year, especially if we pay special attention to their development, which may help us to decide before making them enter school whether they are mentally deficient or not. Removal can then be limited to the cases where the wrong decision was made.

No solution which seems permanent has been found as regards how to carry out selection of handicapped children. One of the causes of this may be that the attempt to admit as many handicapped children as possible to normal, local classes is spreading in Hungary, too. The greater the spread of classes where children of differing development, abilities and school results can co-exist while progressing in the basic fields at different speeds (we saw the developments in this field in the previous chapter), the better the chance of placing mentally handicapped children in normal classes.

With the new entry system there have ceased to be remedial classes in the first form. As we have already mentioned, the main cause of this is that parents have put up ever greater resistance to the segregation of their children. In other words, these classes would have ceased to exist sooner or later. The new entry system, however, offers a solution in which remedial classes become superfluous. Of course, in spite of keeping back the less developed children for a year, there are still some children who need special care in order to progress successfully. Schools have therefore been given the possibility of organizing small first

classes in which the number of pupils can be at most half that of normal classes, if adequate personnel and material are available. The educational work does not differ from that of larger classes in any respect, but they are more effective because only a few pupils are being dealt with. No reliable data are available as regards how many such classes function. As far as we know, only very few do so because separating children in this way is very reminiscent of the notorious remedial classes.

So we can see that neither the traditional device of the segregation of the mentally handicapped nor that of the temporary segregation of the weakest children has ceased to exist in the new entry system, and appropriate solutions have not yet crystallized.

5.2 Procedures for evaluation

As we have already mentioned, the starting condition for operating the adaptive entry system based on the principle of development is that the development of the children can be evaluated. This evaluation has two functions: deciding entry and *assisting differentiated education*. The former is a procedure leading to *classification*, the latter to *diagnosis*. We shall deal with the subject in accordance with these two functions.

5.2.1 Classification

Classifying evaluation used in adaptive registration is achieved in two phases. The first lies within the competence of nursery school and involves all children, and the second is the task of the educational advisory councils.

The members of these councils are psychologists for the most part and besides their main task (helping children with developmental problems and giving advice to their parents), they used to help in the traditional entry system

by making the decisions necessary for selecting those unready for school and for removing the mentally handicapped on the basis of intelligence tests.

In the new system, kindergarten teachers ask them to examine the children whom they want to hold back in nursery school or wish to put forward for registration at school, despite their young age, on the basis of their development. In districts where the number of these children is low, i.e. the possibilities of the new system have not yet been exploited, the educational advisory councils manage to cope with examining these relatively few children. Where the number of those held back or registered at a younger age is higher, nursery school teachers are assisted first of all with the most problematic cases.

As nursery schooling (especially in the last "preschool" grade) can be considered universal in Hungary, the organization and part of the conduct of the evaluation for registration is the task of the nursery school, and the teacher who knows the child best. (A small percentage of children do not go to nursery school, so they have to be called in for an examination.)

The basis of the evaluation is the kindergarten teacher's experience gained by working with the children and educating them, together with a medical examination which covers mainly the organs of sense and the general state of health. This is complemented, if necessary, by an examination by a speech therapist. Besides this, most nursery school teachers use some kind of evaluation tool in addition to their experience which supports their proposals. A list of points drawn up by psychologists, as well as a test battery (such as a shortened version of PREFER: see below) enjoy great popularity.

Evaluation takes place before the end of the school year, in May, in the second and third (final) years. As different methods of application have spread in the new system, as we have seen, the opportunities for evaluation are also manifold and we have no suitable data on these yet. One thing is quite clear: in more and more places the

most important time of evaluation falls at the end of the second year. A year later, before entering school, there are merely checking examinations in questionable cases. But the main stress of evaluation falls in several places, as it has done for many years, at the point just before entering school (especially where the possibility of entering school earlier has not been introduced).

The importance of evaluation at the end of the second year lies also in the fact that (besides assisting in decisions about early registration) it can lead to differentiated education, especially if the evaluation is realized in a way that is appropriate for diagnosis as well (on differentiated education see section 5.3).

The nursery school teacher organizes the evaluation of the children in her group on the above occasions, gathers information from various sources and makes the evaluation herself.

The *simplest method* is that the nursery school teacher forms her opinion about registration on the basis of her experience. If she has spent at least six months with her group, she can rank the children according to their development, and perhaps separately as regards their physical, intellectual and social development.

On this basis, she can judge which of the less developed had better stay at nursery school for another year. The greatest problem with evaluation is where to draw the dividing line between keeping children back and allowing them to enter school. In any case further information must be obtained about the children on or about this dividing line (assessments must be made). Children ranked higher can be evaluated in a similar way. Those who may enter school earlier can be selected and complementary information can be acquired about those who are in the zone of uncertainty.

The *check-list of points for evaluation* is also based on the knowledge of children. The difference lies in the fact, as compared to the above global estimation, that it contains a few dozen characteristics of development. These have to be

qualified separately (classified into some category). The advantage of this procedure is that the nursery school teacher realizes a lot of things as the result of completing the list, which may help her to form a well-founded, comprehensive view.

The greatest advantage of the above two methods of evaluation is their simplicity. Their disadvantage is that they can be applied only in the case of children whom we know very well, with whom we have spent at least six months. Moreover, experience often forms a puzzling, superficial picture which is coloured by our not always conscious emotions. It is even more important that an opinion based on our experience is not convincing or conclusive enough for either ourselves or the parents. This problem can be helped by a *test battery* serving the particular aims of the adaptive entry system. We have worked out such a battery called PREFER for the aims of the Hungarian model. (A narrower and simpler version which was worked out for Sri Lanka can be found in English, too, in the publication entitled *Entry*...).

PREFER was made for diagnostic aims but, at the same time, classifying evaluation can also be carried out with it. A discussion of questions connected with diagnosis follows in the next section. Here, we shall illustrate the operation of this double function only with one example. The test of speech technique, for instance, which serves to evaluate the mastery of correct articulation, examines all speech sounds that can be formed incorrectly (of which there are 25 in Hungarian) and the possible speech defects as well (eight). The values of all items are recorded as a diagnostic evaluation. In this way, we have an "X-ray photo" of the development of each child's speech technique, on the basis of which the further tasks needed to develop it become clear. If we add up the number of correct items, the raw scores we obtain offer a global picture of the development of the child's speech technique. This can be used as one of the indices of classifying evaluation.

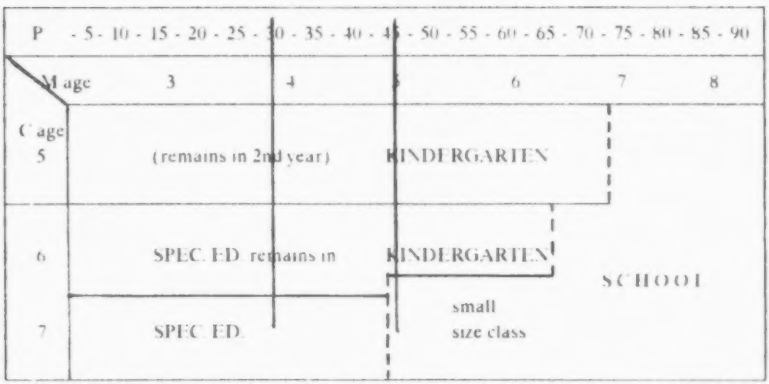
If we want to use the PREFER tests to help decide about registration, we can apply the abbreviated version, which will reduce the assessment time to one third or a quarter. There are two forms of the abbreviated version.

One of the "mathematics" tests can serve as an example. This test consists of 24 problems. The children are asked to perform elementary manipulative and pictorial operations. A suitable method (step-by-step regression analysis) can determine which tasks provide the best estimation of the score obtained by solving all the problems. The task where the child is asked to make six small sticks up to ten explains 55% of the differences between children on the basis of the total score (explained variance). Computers have produced 92% explained variance by selecting five further tasks. If we make the assessment using the six tasks obtained in this way (and, since this is a quarter of all the tasks, we should multiply the result by four for the sake of clarity) it is highly probable that we will obtain approximately the same result as if we had asked the children to solve all the tasks.

The other form requires more attention and practice during the administration of the test, but it is somewhat more reliable and, if we are in the possession of the appropriate auxiliary material, the result can be used for diagnosis, too. (Diagnosis will be discussed in the next section. The essence of this form is that with the help of a graph, the next task we ask the child to solve depends on whether he solved the previous one successfully or not. Remaining with the "mathematics" test example, the assessment starts when the child is asked to "make 12 sticks up to 15". If the solution is correct, a more difficult task is given (take away enough sticks from 19 to leave 16). If the initial task proves too difficult, an easier one is given (take away five sticks from the pile). In this way, only five tasks have to be solved depending on right or wrong results, according to the graph. Two total scores can be found after the fifth task. One of them shows the final outcome if the last task is solved correctly, the other if the fifth task is solved incorrectly. This

score is highly likely to be the same as the result we would have got if we had asked the child to solve all 24 tasks. (A computer determines on the basis of the data from a preliminary survey what the graph should be like and which tasks should be asked at the various points of divergency.)

In this way using the PREFER tests we obtain values expressing the child's development in a relatively short time, so that the important characteristics of starting school successfully can be measured easily. Expressing the raw scores of each test on a standard scale (let the average be 50 standard points), we can form reduced indices. These indices can help the nursery school teacher to form and check the opinions concerning decisions about registration. Interpreting the reduced index of mental development in the child's data sheet is helped by the chart below.



P: standard point M age: mental age C age: calendar age

The chart should be used thus: after finding the given child's standard point P on another small chart, we find the value appropriate to this (the nearest one) in the first row

and we draw a line down the chart at this point vertically. We have indicated two such lines as an example.

The vertical line starts from 30 P in our first example. If the child is five years old by calendar age, which means that he was assessed at the end of the second year at nursery school, this child can be kept in this class according to the data measured. If, on the other hand, he is six years old, and so he is about to enter school but has the same index of development, delaying registration seems to be reasonable. If the child is already 7 years old, we should consider directing him to special education, or to an auxiliary school.

In our second example we have indicated 45 P. If a five-year-old child has this result, he enters the final year of nursery school. If a six-year-old child is involved, there are three possibilities depending on local conditions. If there is a small size class, he can be registered there. But he may enter the normal first class,too, or stay at nursery school for another year. A seven-year-old child with such a score can enter a normal, or, if there is one, a small size class.

It is obvious from the chart that five, six and seven-year-old children with P values of around 65 and higher begin their studies in normal classes.

On the basis of different procedures of evaluation, those concerned (kindergarten teacher, speech therapist, doctor, psychologist, parent) form their opinions as regards their decision on registration. The chart on page 88 in the PREFER data sheet helps to formulate these opinions.

In the majority of cases, when the child's development does not differ from the average of his age to a great extent, he can progress from the second year of nursery school to the final one normally; when he is six, he enters school. In such a case, the decision is made on the basis of the nursery school teacher's, doctor's and parent's opinion, with the agreement of the kindergarten teacher and the parent.

If retardation or acceleration is conspicuously great and the parent agrees to his child being kept back or

registered earlier, a psychological examination is not absolutely obligatory.

In every questionable case, if views diverge, a psychological examination must be requested and the psychologist has to give a report. If the nursery school teacher and the parent cannot reach agreement on this basis either, they must act in accordance with the parent's view.

ESTIMATION (Put the appropriate number and sign!)

Kindergarten teacher		**If 5 years old** 51 enters school 52 3rd year of kindergarten 53 remains in 2nd year
Doctor		
Psychologist		**If 6 years old** 61 enters school 62 small size class 63 remains in third year 64 special education
Speech therapist		
Parent		**If 7 years old** 71 enters school 72 small size class 73 special education

If the child forms more than two sounds incorrectly or if he has some other speech defect he must be sent to a speech therapist. His opinion must also be taken into account in reaching a decision.

Decisions are made in this way all over the country. The formal procedure outlined above is used only where PREFER tests are also used as one of the means of evaluation and formulating views.

5.2.2 Diagnosis

In the previous section we already referred to the fact that while classifying evaluation uses the total score of each test, diagnostic evaluation considers the problems separately: it tries to answer the question of what should be done to help the child's development. The speech technique example showed us that in this case we found out which sounds the child was not able to form properly yet and what other speech defects he had (gabbling speech, devocalization,etc.). From this it can be seen clearly whether the speech therapist or the nursery teacher can help in some way to enhance the child's development or not and, if so, in what way.

Since in that example the number of sounds and other possible speech defects to be assessed is limited and does not exceed what can be assessed at one sitting without tiring the child, *all the items to be assessed can be recorded at one sitting*. So the possibility of diagnosing element by element is provided. Unfortunately, in the overwhelming majority of fields to be assessed, a diagnosis cannot be reached so easily. In this section we shall therefore give some further examples of how to arrive at a diagnosis in the case of some more complicated qualities. Then we shall introduce the data sheet recording the results of the diagnosis.

One of the subtests of the mathematical test assesses the level of mastery of elementary manipulative operations in the range of numbers from 1 to 20. These can be measured with the help of 20 small sticks. However a great number of tasks can be set with 20 sticks. If all the possible tasks were put into the test, solving it would take hours.

According to the theory of classical psychometry, some random examples should be chosen from all the possible tasks. This method, unfortunately, results in a test which may be good for the aims of classifying evaluation but not for content diagnosis, because we do not know which tasks the child could and which he could not solve apart from those included in the test. In other words we do not know what the concrete knowledge is we can already count on and what the child still needs help to master.

In this case we have a test appropriate for diagnosis using the method of *experimental minimalization.*

Its essence is that a small sample of children was asked to solve all the possible tasks at several sittings. The operations which assess the same thing can be found by certain calculations. It is enough to leave one of them in the test. In this way, we arrive at 11 tasks, each of which has a diagnostic meaning.

The child, for example, who can make six sticks up to ten is highly likely to be able to solve any elementary operation in the 1-10 range which is a matter of calculation. But if the next task is not solved (add enough sticks to 10 to make 12), it means that in the case of the given child the elementary manipulative operations already work in the 1-10 range but not yet beyond it. That is, we should set games and tasks for him which begin mastery of the manipulative operations in the 1-20 range using as a basis skills in the 1-10 range.

In the case of writing movement co-ordination, in two steps we arrived at an assessment tool suitable for diagnosis. First - as we mentioned in 2.2 - we analysed the system of handwriting and paid particular attention to the elementary lines and types of connection. Then we composed drawings of varying degrees of complexity, and in this way we covered the content to be assessed by tasks. These drawings have a diagnostic value in themselves as well. Whether a child can draw a circle or a loop is an important piece of information. But the copied drawing includes a lot of important pieces of information beyond

the fact that its shape is recognizable, e.g. its position on the paper, its size, etc.

That is why analysing the system of writing, and constructing tasks using the components, is not enough. It is also desirable that we should work out *qualitative levels of diagnostic value* which can be adjusted to certain scores on the basis of the drawings copied by the child. Four levels are worth considering. A maximum of 24 can be scored in the test. (The Sri Lankan variety uses another scale, so the scores below are not valid in that test.)

The child is on the *scribbling* level if his scores are below four or five. That is, in such children the mastering of writing movement co-ordination has not started yet. The phase of the development of the skill, i.e. the mastery of *elementary writing movement*, begins with scores above four to five and a score of 12-13 marks the end of development, reaching the minimum criterion. Children at this level copy all the elementary units so that their shape is recognizable, positioning and size are all right in the majority of cases, and recognizable double connections are reproduced. In other words, mastery of the use of connective elements has started. Whoever is below the minimum criterion is unable to copy complicated figures. At that level - as letters are complex figures - the teaching of writing is not successful and is not worth forcing. Luckily, the number of such children diminishes rapidly at the age of 5.5-6.5. But in the case of children above 6.5, a score below the minimum criterion may mean dysgraphy.

The development of *complex writing movement* starts above the minimum criterion. This procedure is indicated by scores of 13-20. Since at that time the child is already able to appreciate and copy complex figures, teaching him to write becomes possible, but the nearer the child is to the minimum criterion, the more troublesome and slower the procedure is. Fortunately, the maturing process is quite quick at the age of five to six, so that the teaching of writing does not meet with failure.

Optimal mastery is marked by a score of 20-plus. Learning to write is easy and quick at the level of *optimal writing movement* because there are no problems of writing technique at this level: only the meaning of each letter has to be mastered (which letter corresponds to which sound).

Finally we mention the *method of parallel tests.* In the first chapter we outlined the importance of mastering relational vocabulary in the light of starting school successfully. We saw that we have about 200 words denoting basic relations. If we want to develop a test for diagnosis, all 200 words have to be included. We have solved the problem by dividing the terms of space, quantity, measurement and time proportionally among so many test versions that one version may be administered as briefly as possible, but without endangering reliability by having too small a number of items. (There are 25 terms in the Hungarian version and 20 in the Sri Lankan test.)

The range of difficulty of the terms in each category can also be reproduced proportionally in the test versions by experimental assessments on the basis of the grade of difficulty (relative frequency) of each term. After that the data of the representative survey can help us to analyse whether knowing or not knowing a term of a given grade of difficulty in a given category will allow us to estimate the knowledge of words in the entire vocabulary range. In this way we obtain quite a good picture of how many terms of the entire relational vocabulary the child knows by administering only one test version.

The *data sheet* containing item by item the level of mastery reached by the child is a useful tool of diagnostic evaluation.

With the mathematics test as our illustrative example, the following series of data is available to the educator for all children in each field examined.

a b c d	e f g h	i j k l	m n o p	q r s t	u v w x
1 1 1 1	1 1 0 1	1 0 1 0	0 0 0 0	0 0 0 0	0 0 0 0
	1	1	1	1 1	

The letters identify each item and the numbers under them mark the mastery of the items. It is obvious from our example that this child has already mastered the manipulative elementary operations in the range 1 to 10 at the time of assessment. The 1's in the bottom line show how much the given child has developed in one year.

We suggest that the child should take the data sheet to school with him as well, as it could be of great help to the teacher. But this possibility is exploited only in very few places. Unfortunately, we do not have enough knowledge or ideas to take greater advantage of it.

5.3 Preventive education in pre-school

Most nursery schools in Hungary are full-time. Their opening hours try to meet the requirement that parents can arrive at their work after having taken their children to nursery school and can collect them when they have left work. As work starts and ends at different times, some children arrive earlier, others later and some are taken home earlier while others stay at the nursery school later. Because of this, nursery schools are open for 10-12 hours. Nursery school teachers work in two shifts. The morning shift is over at about lunch-time and the afternoon shift begins at the same time, when for a short time both teachers are present. This overlap can last for up to half an hour if necessary. (As we shall soon see, this situation plays an important role in the operation of preventive education.)

According to the programme of nursery schools (*Az óvodai...*,1978), which imposes similar principles throughout the country, compulsory activities should be carried out. These last for two hours a day in the third year of the nursery school (which can be called pre-school), and are organized in the morning, usually before eleven o'clock. The more important activities are the following: physical education, stories/poems, singing, drawing, and "mathematics". The rest of the day is dominated by various games in a free form.

One of the most important educational principles of nursery school is differentiated treatment, which takes into consideration the differences between children. Good educators take this really seriously and apply it. But as there are 15-30 children in a group, the effectiveness of this attempt is very low. Since the beginning of the 70's, in line with international trends, various ways of helping disadvantaged children who develop more slowly have spread in Hungary too. These have resulted, in fact, in a firmer application of the traditional principle of individual treatment. As these attempts were based on the conventional activity of nursery schools, their modest results have not been the shocking failure that they were in many countries.

Only one specific programme has taken an individual shape. For a long time it functioned only as an experiment, while compensation programmes everywhere faced an international crisis, but then at the beginning of the 80's it began to spread after the book by Csertő et al. (1982) publishing the programme and its results had come out. This section deals with this programme.

Already in the conventional entry system some problems were raised by the increasing number of children kept back in the nursery school because they were found to be unready for school. The experiments of the adaptive entry system crowned this by being put into practice in more and more places, which had the result that the number of children kept back at nursery school increased

even more. The traditional programme of nursery schools works with contents and activities built continuously one on the other. The question was raised as to what was to be done with the children kept back. Was it right that these children should have to repeat the whole year's programme with a group of younger children?

A lot of other circumstances indicated a need for a looser, less constricting programme than the conventional one for nursery schools. The introduction of the adaptive entry system, the problem of children kept back and the needs of their development demanded this, too. The programme of the nursery schools, however, was not able to change fundamentally, not even after several attempts. So there was a delay in the task of preparing a programme for nursery schools which could fit in with the new entry system, help to cope with the differences between children, and make possible the education of the many children kept back in a more adaptable way, and include the preventive educational programme about to be described. Therefore, for the time being, we are going to discuss the preventive educational programme as a separate activity inserted in the conventional *framework* of organization described above.

The essence of the programme can be summarized as follows: the less developed children are selected from the nursery school group on the basis of a development examination. They number usually about four to seven. They are more than one year behind generally, so that the usual method of individual treatment is not enough to help their development effectively. What follows from this is that we should deal with these children in accordance with a specific programme at the same time every day.

In the 70's, in the period of research, we tried several organizational forms. One of the extreme solutions was taking out the retarded children from their group for good, forming a separate group of them and helping their development by intensive treatment for a year. The other extreme was to enrich development through individual

activities in their nursery school group, so that the retarded did not make up a distinct group. Different stopgap solutions were tried between the two extremes.

At last it proved to be disadvantageous to separate these children from their local group. Appropriate treatment can accelerate their intellectual development considerably but their social development is not satisfactory. The greatest problem is that their adult environment considers their segregation in separate groups a stigma. This attitude can be felt in children too, so that the effectiveness of intellectual development work then diminishes gradually. Individual treatment, on the other hand, cannot be effective enough in intellectual development.

It seems to be a useful organizational solution to let retarded children spend most of the time together with their local group. For a short while, 15-20 minutes a day, they are separated from the others and withdraw with the nursery school teacher to a separate room or, if this is not possible, to a corner of the room which is detached symbolically. At that time the nursery school teacher deals only with these few children. The others play while someone looks after them. (The person who takes care of them for 15-20 minutes can be the nurse, a relative of one of the children, the other nursery school teacher, etc.)

The solution whereby this separate activity is organized at about half past eleven, after a walk and game in the open air for at least half an hour, and after the whole group has been dealt with, could fit in best with the Hungarian curriculum and organizational traditions. At that time the nursery school teacher who takes the second shift is due to arrive as well.

We showed in the previous chapter that educational work in a group of not more than six students, in a micro-class, is radically different from bigger classes or groups and is more effective. Therefore not more than six children were admitted to these preventive groups. There were seven children in a group in some exceptional cases, but

having an extra child made it considerably more difficult to build up personal contacts with the children. This happened where either the group was too big or the nursery school was in a social environment lower than the average so that the number of retarded children was higher than average. At the same time, breaking up the group and organizing two preventive classes was not possible. For instance, in a nursery school functioning with only one teacher, there is insufficient personnel for two micro-classes, but where it was necessary and possible, we organized two micro-classes from one local group. This became the practice in 15-20% of experimental nursery schools.

As for the *contents of the preventive programme*, after examining the links between most of the different indices of development we arrived at the conclusion that the dominant factors of mental development at this age were mother tongue and "mathematics". Results assessed in these two fields decisively determine the values of the reduced index of mental development. At the same time, the index formed by all the indices is determined by the development of mother tongue, mathematics and social development. It follows from this that if we have results from these three fields, we can speed up the development of the personality entirely. Therefore we concentrated on developing social, mother tongue and mathematical competence in the preventive programme. As for all the other fields and activities, these children took part in the same things as everyone else in their group.

Children who are put in a micro-class are nearly all *undeveloped socially,* too. Most of them are isolated from the other members of the group, and perhaps do not want or are not able to communicate with the nursery school teacher either. As their attempts at communication often fail, they are timid and shy. Many of them tire easily. Others are violent and aggressive towards their fellows because this is the only way they can express their will. It is generally characteristic of these children that they do not take part in the activity of the group or do so only to a small

extent, and that their self-confidence and concentration are undeveloped. All these things hinder their intellectual development.

So the most basic aim of the preventive programme is to increase these children's activity and self-confidence through success, to raise their status within the group and to improve their concentration. We try to achieve these aims by methods applied in the course of mother tongue and mathematics "lessons" and not by any direct attempt to develop these children's attitudes.

First of all, the fact that they are in a micro-class and withdraw for 15-20 minutes a day should make the children feel that exceptions are made of them for that short while and that they receive more love and attention. They can take part in games and activities only for them. We should also try to form the attitude in the other members of the group that belonging to a micro-class is desirable or perhaps neutral, but certainly not something to be avoided. This is the primary condition of the programme's success. If the group does not have a positive attitude to the members of the micro-class and perhaps makes fun of them this demotivating effect can hardly be avoided.

These aims are served by harmonizing the activity of the micro-class and the whole group. For example, if we intend to tell a story to the full group and start a conversation about it, we tell it to the micro-class several times well in advance, dramatize it and talk it over. When this story is discussed in the whole group, the children in the micro-class can tell or dramatize part of it. A few successful role-plays like this can change a child's status in the group considerably, can reduce his shyness to a great extent, increase his self-confidence and form a positive attitude in him towards the activity of the micro-class. In short, by making use of the extra knowledge gained in the micro-class carefully, we can continuously develop social competence.

The contents of the *mother tongue* course are a couple of dozen rhymes, short poems and short stories which can

be told in three to five minutes; things found in the environment, series of cards depicting events, and items needed for puppet games serve to develop vocabulary and speaking ability, while illustrations showing relations are devices used in games to help the mastery of relational terms.

Children sing songs, poems or cheeky nursery rhymes accompanied by dancing or actions. We continue to deal with some of the chosen rhymes and poems at certain times until everybody has mastered them perfectly and can recite them alone as well. After that they are used more rarely and only so that they will not be forgotten (whoever knows a rhyme or a poem with absolute certainty, may recite it before the whole group).

There is a story as well on each occasion. We use stories in turn, again and again. First we read them out, then tell them freely, after that "dramatize" them, show slides, if there are any, illustrate them with drawings of the main characters and events, perform them with puppets and, finally, act them out together with the children. We tell the story in a different way each time. The more the children become acquainted with the story, the more we try to involve them in it. For example, they impersonate the heroes and objects in the story. They are given pictures of the heroes, the important things and events. When something or somebody is mentioned in the story, they show the appropriate photo, or move about with it in accordance with the plot. Later they themselves can say the words of the characters. In this way they can tell and act out the whole story. When it is going very well, they can show it to the whole group. In a year's time they assimilate the majority of the two dozen short stories and can reproduce them as well.

Of the many different games we would like to mention specially the "relation games". There is, for instance a drawing of a bird fixed to a stick. A member of the group makes the bird fly to different places. A child says: "the little bird is flying, flying, ...flying, ...perch!" Then

the bird must stop flying. The other children have to say where the bird has flown. Whoever answers correctly and quickly is the winner and is rewarded in some way (a score, etc., according to custom). The nursery school teacher tells the children the correct answer if everybody was wrong. Games of a similar type can be used to practise all relations.

Children like the game "What's in the bag?". We put into a bag five or six objects which everybody has seen beforehand. The nursery school teacher puts her hand in the bag and takes hold of an object. Then she asks: "What colour is the thing I have in my hands?" "What does it weigh?", "What is its shape like?", "Has it got a head?", "What is it made of?", etc. Everybody answers in turn. The teacher always says if the answer is correct. On this basis the children can guess what the object is in the nursery school teacher's hand, but whoever gives a wrong answer is out of that round of the game. If nobody wants to try, they can ask about the characteristics again, then guess. Whoever names the object first, wins. The aim is to enlarge vocabulary denoting characteristics.

On the basis of these few examples, the reader can imagine what the atmosphere of these games is like and what happens during them. Usually a song accompanied by actions ends the ten to twelve minute activity in the mother tongue. This is followed by *mathematics* for six to eight minutes.

The majority of children entering school have concepts of numbers between 1 and 20, but the rate of those who are at home in the 1 to 100 range or even higher is not insignificant either, as we saw in the first chapter. We have also referred to the fact that mathematical knowledge at this age is a basic factor of mental development. The correlative coefficient between the index of mental development and the development of counting ability is 0.78 and this correlation rises to 0.86 with the development of manipulative operations and number reading.

It follows from this that it is impossible to help the mental development of children who are at the level of the 1 to 5 range and are still uncertain in the 1 to 10 range until they master counting ability and manipulative operations at least in the 1 to 20 range. Without this, it is impossible to develop their abstract ability and comprehension and to deal with more complex connections.

We found it necessary to draw attention to what has been said above because nowadays a few games are available to help the development of elementary mathematical ability which give the children pleasure as they play, as we saw in the case of activities in the mother tongue. We now have to use exercises involving play. There are some psychologists who pull faces at this, saying that nursery school should not be made into school. The only thing we can reply to this is that six, eight or at the most ten minutes a day of direct practice cannot do any harm. On the contrary, the really conspicuous development of these children makes them well-balanced and the time they spend with the other children becomes more enjoyable.

The number of mathematical activities is about 150 a year. Of these 20 to 30 are necessary to ensure that everybody can count, manipulate and read numbers in the 1 to 5 range with absolute certainty. For the 1 to 10 range 50 to 60 lessons are needed and 60 to 80 for the 1 to 20 range. The content of activities is: counting and comparing sets of things by estimation or by making pairs, deciding their number by counting, arranging them according to their size, addition, subtraction according to given values, making things equal or unequal, recognizing numbers, associating sets of things, spoken numbers, figures and written one-digit numbers.

Children count aloud together (to the accompaniment of clapping, walking, swaying or some similar movement) in each lesson twice or three times. This requires only two or three minutes at the most. Most of the lesson is spent in sorting things as a game, selecting them, playing games together, playing with mathematical rules and the like.

For example, children "work" in a parking area. They push cars around. In the meantime they count how many have gone out or come in and which one in numerical order has gone out. Or they rearrange the pantry. The jars of fruit and jam, etc., are numbers drawn on cards. They get a rule for sorting, such as "there should be as many apples on the shelf as pears".

Of the indoor games, those played with dice are really very useful (first with one, then with two dice), as are special card games. For instance, there are numbers on the cards in the "jolly Teddy bear" game. We give each child five cards. Players have to collect pairs marked with the same number. They draw from each other's cards in turns, and if they have a pair with the same numbers, they lay them down in front of them. Whoever has the most pairs and gets rid of all his cards first is the winner.

We think it is not necessary to give further examples of exercises involving play, because from practical nursery school education and educational literature a wide choice of them can be found. Our examples were only meant to illustrate what happens during the mathematical activities of the preventive programme.

As for the *effectiveness* of the preventive programme, many types of evaluation have arisen during the course of more than a decade of experiments and practice. We shall now present some data, for the sake of clarity.

The sociometric status of the members of the whole group was assessed at the beginning, in the middle and at the end of the school year. At the beginning of the year, none of the six children attending the micro-class received votes. In the middle of the year already three children indicated children from the micro-class as their friends. And at the end of the term the number of votes was nine and none of the children attending the micro-class was left without friends. Seven of the nine votes were made by children in a peripheral situation (but not in the micro-class) and two by the favourites of the group, given in return for the votes of children in the micro-class. The

members of the test-group voted for children with a good or highly favoured sociometric status only.

One of the assessments indicating mental development extended to 41 children and the PREFER, the SON and the Binet-Simon tests were used as means. Assessments were made at the beginning and at the end of the school year.

Name of test	PREFER		SON		BINET-SIMON	
Time of assesment in school year	begin-ning	end	begin-ning	end	begin-ning	end
Average	29	57	75	96	88	99
Relative deviation %	44	15	21	11	13	11

On the PREFER scale, the minimum for entry is a score of 50 and the average of one year's development is 10. What follows from this is that the starting level of 29 for the 41 children is two years lower than the minimum for entry. As the average is 57 at the end of the school-year, this means that they have developed 2.5 years in one year, i.e. they have made up 1.5 years of their retardation.

The children who were behind the minimum for entry by less than two years, started with an average of 35.5 and entered the first form with scores of 62.5. This is approximately the same as the general level of development of six-year-olds entering school. Of these 22 children, if we reckon the average for the first four classes, one reached a result of 2.2, four 2.7-2.8, and 17 over 3. Two of them left the lower section, the first four years, of primary school with a grade of 4 or better. (In Hungary, children are marked on a scale of five grades, where 1 is a fail.)

Of the 19 children who lagged behind by more than two years as compared to the minimum for entry, three

proved to be handicapped so did not enter school. A further 8 children could not make up enough of their retardation of more than 3 years to be able to start their school career successfully. They repeated one of the classes in the lower section or achieved very weak results. The others left the first four classes with low grades.

On the basis of the results of all our examinations, we can draw the generally valid conclusion that with a programme like the one we have demonstrated above, a lag of a little over one year can be made up. For children who are further behind, it is absolutely necessary to postpone entering school till the next year, so that they may start their school career with some hope of success.

6. CONCLUSIONS

In the introduction our starting point was that, in keeping with the theory of lifelong education, the rigid grade system, and the articulation of the family home, pre-school and school must be re-evaluated in order to find a flexible form of co-ordination to assist in the optimal and continuous development of the individual.

This re-evaluation has led us to a series of important conclusions. The essence of the problem lies in the fact that within a given generation the children differ from each other strikingly. Children with a calendar age of six years can differ by more than ± 1 year biologically, by ± 2.5 years as regards mental age and by ± 3 years in social development (leaving aside the two groups of least and most developed children occupying 5% at each end of the scale).

School cannot cope with these differences. As a result of this the school career of those entering school is pre-determined by their level of development: failure, repeating, low or higher academic results. The heterogeneity caused by extremes in development also limits the efficiency of innovations, i.e. the extreme differences between pupils in a class determine the possibilities of effectiveness to such an extent that by comparison any educational innovation can be of only marginal significance.

We analysed the experiments dating from the beginning of the century which attempted to deal with this wide-ranging heterogeneity. We arrived at the conclusion that of the manifold experiments tried so far none appears to provide a solution to the problem. In the case of some more widespread experiments (e.g. ability grouping) we examined why they do not. We found that, considering the exceptionally complicated nature of the problem, the responses presented so far were rather simple and only one

or a few of their elements caught on. At the same time the analysis led to the realization that the various concepts and experiments conceal to this day many of the intricacies of the problem. The conditions are ripening for these partial results to become a complex system and for an alternative school capable of dealing with the extreme differences between children to come about.

One element of such a school could be the alternative entry model introduced in Hungary in accordance with the requirements of the 1986 law on education. Its essence is that children are not registered at school according to their calendar age but according to their stage of development. As a result 20-30% of children with a calendar age of six years do not enter the first grade but spend another year at nursery school. At the same time those five-year-olds who are nearly six and whose level of development is above the average for six-year-old children are accepted in the first grade. Consequently the less developed six-year-olds (about one third of the total) enter the first grade one year later when their level of development has risen naturally by one year. On the other hand the most developed five-year-olds become first-graders one year earlier with the result that they do not lose the starting advantages given by their extremely high level of development. Finally, the heterogeneity caused by the extremes in development of children entering the first grade are considerably reduced. By this means the possibilities of increasing effectiveness are raised.

We have tried to present the Hungarian school entry system in a comprehensive way: however, this is only one special case of a theoretical model. Depending on the circumstances and the traditions of the school system in the given country variations are possible. It follows from this that the Hungarian model cannot be adopted as it stands. Every country which is considering introducing a flexible school entry system relating to the level of development of the children must work out for itself the form most likely to suit its own circumstances.

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